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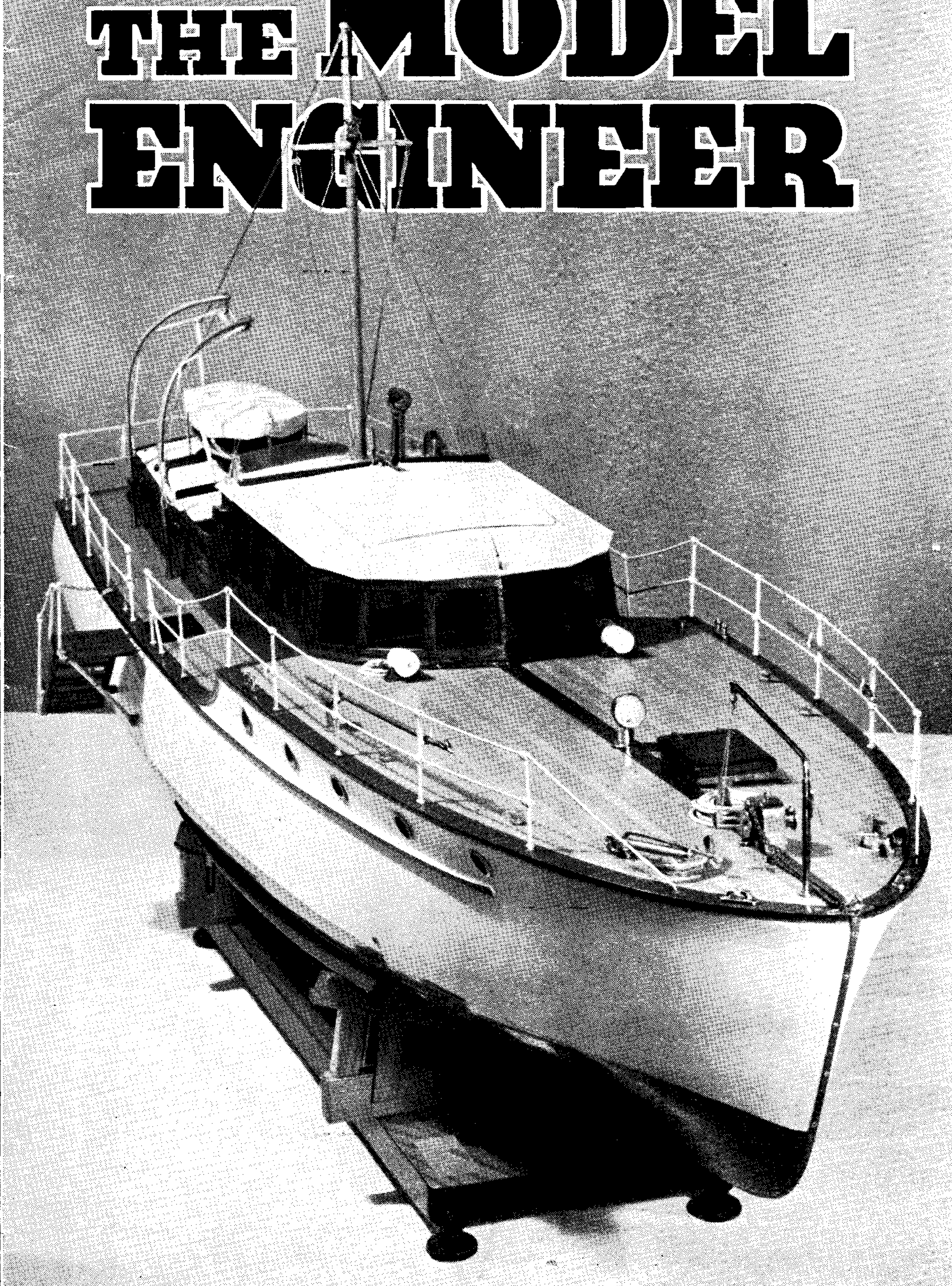
THE MODEL ENGINEER



The MODEL ENGINEER

PERCIVAL MARSHALL & CO. LTD., 23, *GREAT QUEEN ST., LONDON, W.C.2*

3RD MAY 1951 VOL. 104 NO. 2606

SMOKE RINGS

Our Cover Picture

● THE PHOTOGRAPH this week is of a working model Vosper motor yacht made by Mr. A. S. Ablett, of Ruislip. This was exhibited at last year's "M.E." Exhibition in which it was awarded a bronze medal. Much has been written from time to time about the graceful lines of the old wooden ships, but here is an example of one of the most modern types of ship which is in no way inferior in grace of line to the older ships. The fine entrance is flared out to a wide fore-deck which gives plenty of room for working, and at the same time keeps the deck clear of heavy water under rough weather conditions. The rails lead aft in an easy curve to a wide transom giving bouyancy aft, cut away underwater to an easy run which ensures a smooth flow of water to the twin propellers and rudders. The central cockpit enables the vessel to be controlled from the most comfortable position in the ship, and the day saloon forward with its big windows permits the ship's company to enjoy the views in luxury and comfort. The woodwork of the cabins and decks was beautifully carried out in this model and the companion ladder with its grating was in keeping with the rest of the work. The scale of the model, which is ⅜ in. = 1 ft., permits of all the detail of the prototype being included without sacrificing the strength and robustness necessary for actual sailing conditions.

A Public Library Service

● WE HAVE received a copy of each of two leaflets from the Islington Public Libraries; they contain lists of a long range of books covering almost every scientific and technical subject. The lists are arranged conveniently under main headings, from general science, botany, chemistry, geology, meteorology, physics and zoology to building construction, surveying, engineering, electricity, printing, metallurgy, foremanship and management; in addition there are several periodicals dealing with technical subjects allied to those just mentioned.

We have previously commented favourably upon the tendency for public libraries to cater more and more for the needs of those in search of scientific and technical knowledge, and we should imagine that the Islington libraries are right in the forefront in this matter.

Some Truck!

● THE FOLLOWING advertisement recently appeared in a provincial newspaper :—"**Miniature Railway Truck.** 800 to 1,000 yards. Suitable for any gauge. Comprising steel rails, fishplates, bolts and oak sleepers. New last season, but not used on account of owner's illness . . . Price only 10s. per yard complete."

This appears to be a truck that is well out of the ordinary and quite a bargain at the price!

Another Rotary Club Exhibition

● WE UNDERSTAND that there is a hobbies exhibition open in Pontypridd until Saturday next, the 5th inst. It is another of those which have been sponsored by local Rotary clubs with a view to stimulating public interest in hobbies of all kinds and are therefore to be warmly commended.

The one in Pontypridd is housed at the Y.M.C.A. building and is open at 10 a.m. each day. The model engineering hobby would appear to be a prominent feature since no fewer than five Cardiff clubs promised support; these are: the Cardiff Model Engineering Society, the Whitechurch (Cardiff) Model Engineering Society together with the Model Railway Guild, Model Yacht Club and the Ship Modelling Society, all hailing from the same city.

We are rather surprised to note, by way of contrast, that there does not appear to be a model engineering society in the whole of the Rhondda Valley. Perhaps this exhibition at Pontypridd, with its striking contribution from Cardiff, may do something to bestir local interest in our hobby.

The British Light Steam Power Society

● AT THE second annual general meeting of the above society, held recently in London, evidence was given of the keen enthusiasm which still exists among amateur steam engine experimenters, including devotees of steam cars. Many of the members made very long journeys—in one case from central Scotland—to attend this gathering. The aims of the society are to encourage the development of light steam power for all purposes to which it is applicable and particularly for road traction and marine work. It concentrates specially on providing facilities for the interchange of knowledge, experience and views on this subject, and plans are in hand for the practical development of ideas, though details of these are not to be made available for general publication until concrete results have been attained. The list of members includes many names familiar to readers of THE MODEL ENGINEER and associated with steam engine development in the past. The officers of the society include Lieut-Col. A. G. Steele (president), Messrs. Thos. Hindle (chairman), K. Hellon (vice-chairman), J. N. Walton (hon. secretary), and F. H. Babcock (hon. treasurer). A quarterly journal, *Light Steam Power*, is issued by the society, containing illustrated technical articles and reports of progress in steam plant development. For further particulars of the society, enquiries should be addressed to Mr. J. N. Walton at Edenholme, Weatheral, Carlisle.

Bekonscot Reprieved

● WE ARE very glad to learn that the ever-popular little village of Bekonscot has been saved from the destruction with which the Bucks County Council had threatened it. As most of our readers know already, the village of Bekonscot was built in the later 1930's, to the scale of 1 in. to 1 ft., in the garden of Chilton Lodge, Ledborough Lane, Beaconsfield; it all began in 1929 as a model railway planned by Mr. R. R. Callingham, who with the aid of two friends, Mr. R. W. Covington and Mr. A. J. Clarke, expanded the idea until an entire village had grown on the site. It is all very delightful and has attained world-wide renown as a result of its having been opened to the public, who were expected, on admission, to place a contribution in a Red Cross box. Since 1929, more than £30,000 have been raised for charity, and the little village has endeared itself to all, from Royalty to the humblest visitor.

Recently, however, some local residents complained that the village was having a detrimental effect upon the amenities of neighbouring properties; this resulted in the County Council opening negotiations with the trustees, on the basis that the village could remain for ten years or during the lifetime of the founder, whichever was the shorter. These negotiations failed, so the next step was the serving of an enforcement notice under the Town and Country Planning Act, requiring discontinuance. An appeal against this order was allowed by the local magistrates, with costs against the County Council; so Bekonscot will carry on as usual, for the time being, at least. We sincerely hope that the reprieve may prove to be permanent and that some other means than those already suggested can be found for meeting any complaints from local residents.

The Tyneside Society's Track

● WE LEARN that the Tyneside Society of Model and Experimental Engineers is preparing to hold a rally on Whit Sunday and Monday, May 13th and 14th, to celebrate the opening of the society's track in Exhibition Park, Newcastle. Tickets and further information can be obtained from the Hon. Secretary, Mr. L. Jamieson, 34, Dorcas Avenue, Pendover, Newcastle-on-Tyne, 5.

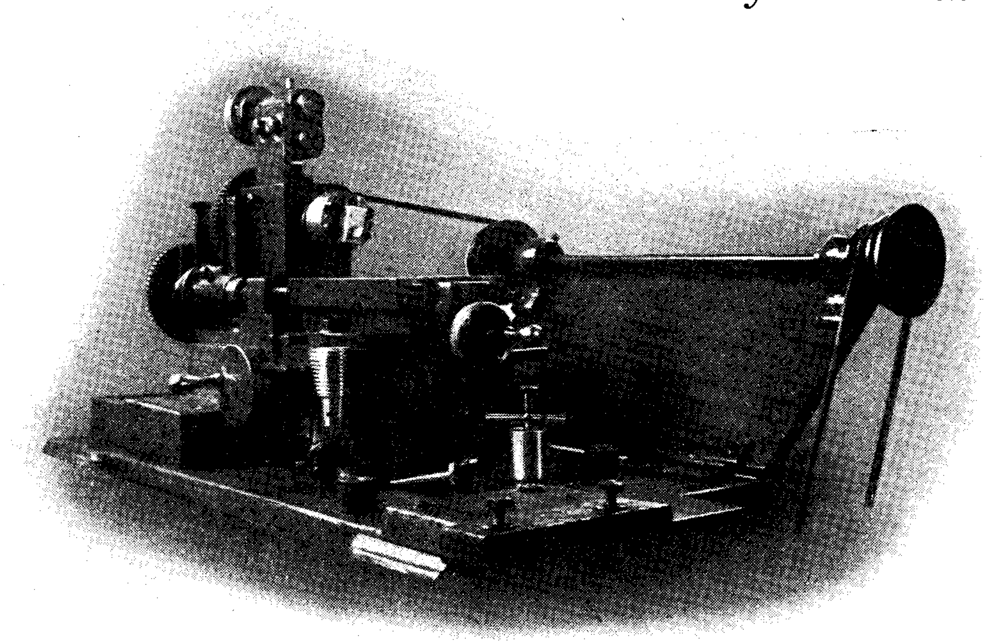
An Unfinished Task

● TO SET out to build, single-handed, a 20-ton ocean-going yacht is a task which, we should imagine, requires more than ordinary courage and determination. Yet we have recently heard of such a case; for Mr. W. Tomlinson, D.S.C., was actually constructing, in the garden of his S.E. London home, a boat having a length of 45 ft., a beam of 11 ft. 6 in. and a draught of 6 ft. 3 in., and he had hoped that he and his family would, in due course, be able to sail the craft to America, where he intended to settle down.

Work on this almost superhuman example of amateur boat-building began in June, 1947, but was never completed. In two years, the deck had been laid and caulked and half the hull planking was in place. Then Mr. Tomlinson was taken ill and died; he had been a Commando officer during the war and was very severely wounded while returning from a Commando raid on Le Touquet. All the more credit to him, therefore, for having begun alone upon so stupendous a task which, unfortunately, he was never to complete. The half-finished hull has now been taken to a Chichester shipyard to become the property of a new owner.

A "Multi-Purpose" Tool

by W. Holden



Set-up as a horizontal boring machine with adjustable tool holder in headstock spindle. Samples of work done are shown on platform

THE compactness and the ability to cope with the varied machining operations necessary to the average model engineer, must surely appeal to readers of the following brief description.

In most amateur workshops, the lathe is generally recognised as the basic tool and, fitted with the necessary attachments for milling, etc., meets the average requirements. As will be noticed when perusing this article, the writer has approached the subject from a different angle, the lathe becoming one of the attachments.

The method used to adapt the tool as a centre lathe complete with guide screw and change-wheels will, no doubt, be of interest to a great number of readers, particularly those who are limited to the amount of space at their disposal in pursuit of their favourite pastime. While the tool has been fitted up on a stand, it can be rigged up on the end of the bench in any odd corner if necessary.

Some years ago, I acquired from the scrap heap a small knee-slide which appeared to have been part of a bench milling machine. My first intentions were to add the necessary parts and use it as a horizontal milling machine, but as the photographs will show, a very different result was obtained than originally intended.

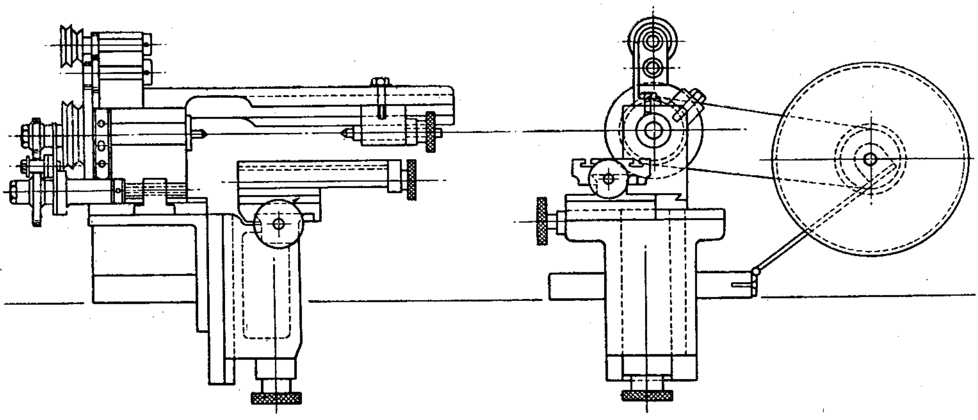
The basic principle is similar to the horizontal milling machine with knee-slide, on which is mounted the compound slides, to obtain cross and longitudinal traverse. An angle-plate forms the base on which the slides carrying headstock and knee-slide are fixed, the drilling and shaping attachments also fit on the same face as the headstock and can be changed for the appropriate operations in a matter of minutes.

The headstock was made from a rectangular block of cast-iron suitably bored to accommodate the spindle on which is fitted a two-speed pulley with gearwheel attached, for use with the back gear.

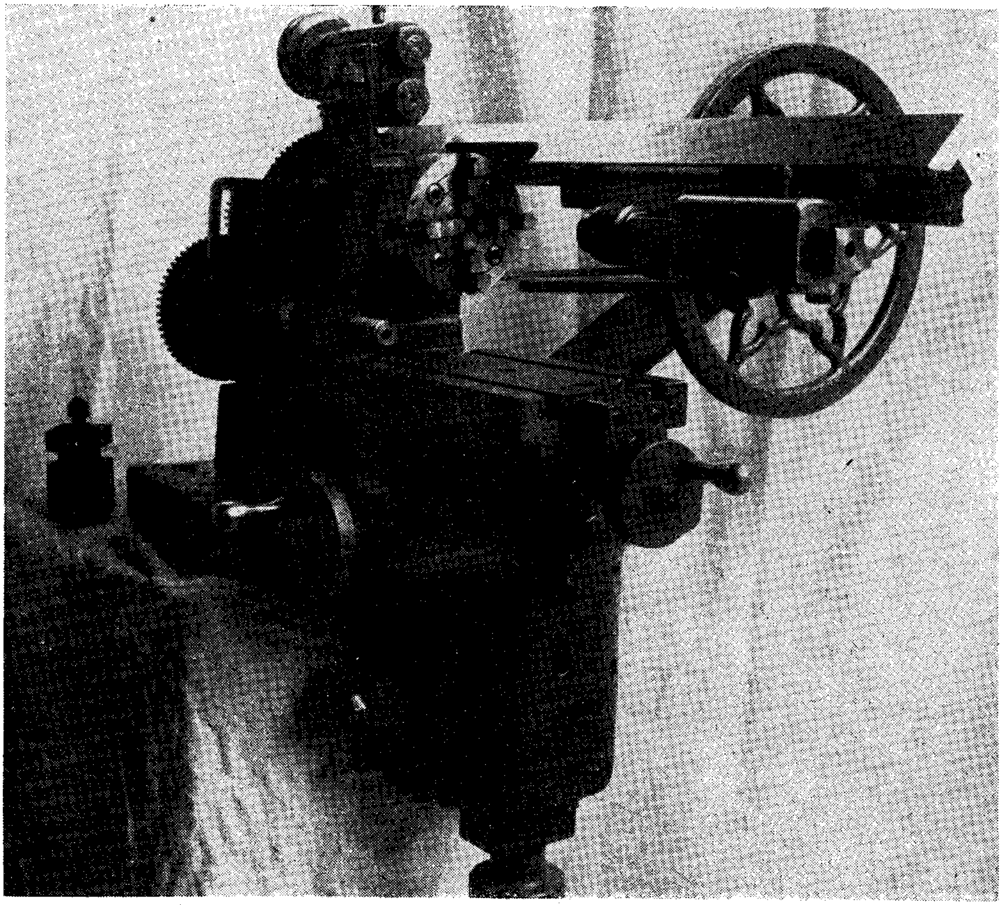
The back gear arrangement is mounted on the top face of the headstock, has its own driving pulley, and when required to be brought into operation it is only necessary to slacken two screws, lower gearing bracket to position and change belt from single to back gear drive pulley. One of the photographs illustrates the method used quite clearly.

The countershaft bracket, which is of aluminium, carries the two bearings and shaft with a pulley fixed at each of its ends. The countershaft is self-tensioning and hinges on the platform which carries the complete attachment.

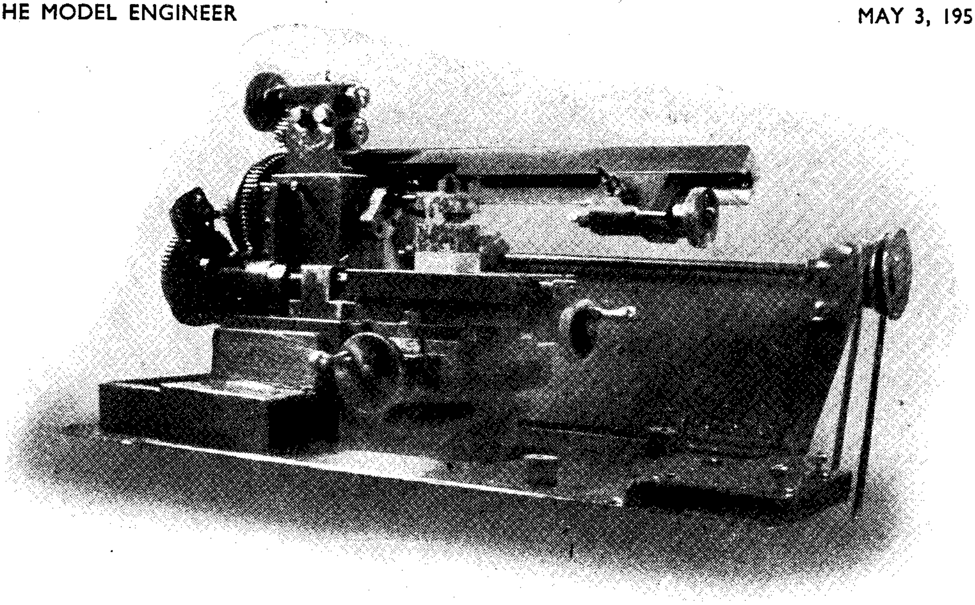
In the meantime, a hefty shoemaker's sewing machine stand was obtained from the junk store, complete with treadle and crankshaft



Two views of the turning attachment



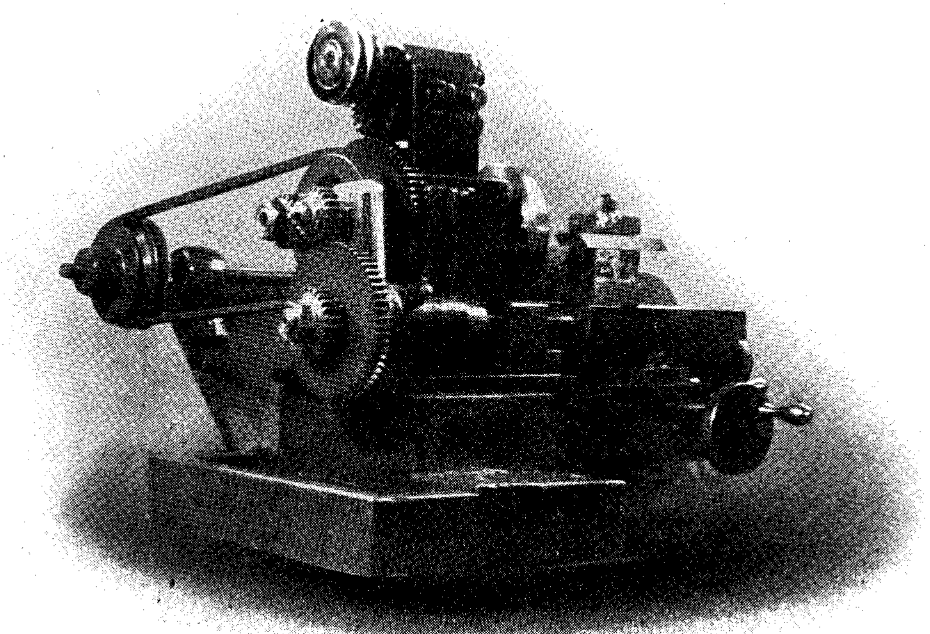
Set-up as a centre lathe with four-jaw chuck in headstock and lever-operated tailstock fitted with 0-¼ in. capacity drill chuck



Set-up as a centre lathe, showing bar in position which carries screw-type tailstock. Guide-screw arrangement is also shown

which protruded through a bearing on the right-hand side of the frame. On this end of the crankshaft was fitted a three-step pulley and the rim loaded with lead to give added weight.

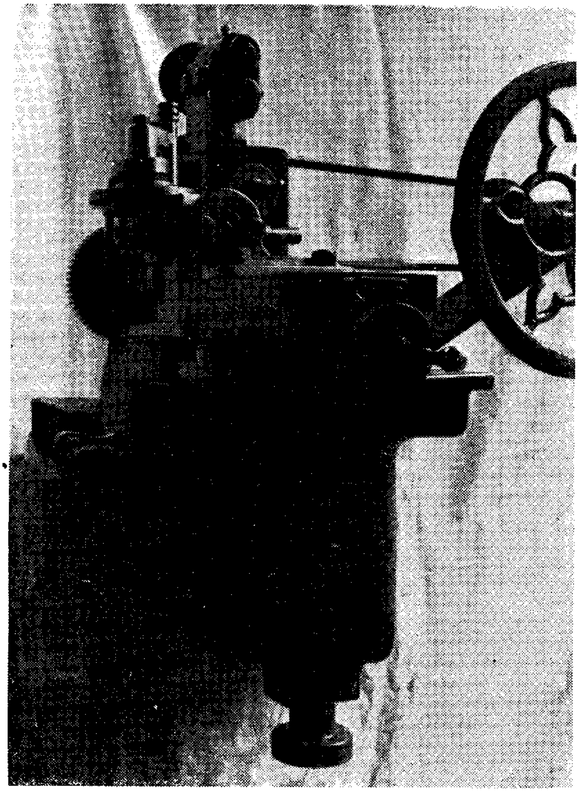
At this stage several milling operations were carried out, during which time the machine's possibilities as a chucking lathe were considered, and it was decided to fit a square tool-holder to carry $\frac{3}{8}$ in. tools, and with a self-centring chuck in the headstock spindle, it proved very adaptable



End view, showing drive from countershaft to headstock spindle. Back-gear drive to spindle fitted on top of headstock and guide-screw bracket—swing frame and change gears

for the turning of small parts due to the fact that the handles for the cross and longitudinal traverses were easy to manipulate on account of their accessibility. The tools are easily brought up to centre height by adjusting the handwheel controlling the vertical movement of knee-slide.

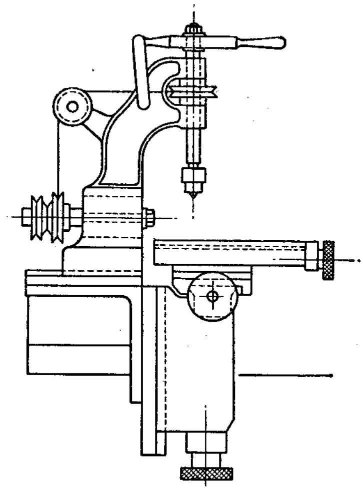
How to adapt the machine to centre-lathe turning was the next proposition to be tackled,



Set-up for horizontal milling with dividing-head mounted on work table. Tailstock can be fitted to support milling arbor when necessary. Handwheel for elevating knee-slide is shown below

and much time and many ideas were tried out before the one illustrated was arrived at. The headstock, being of square section, lent itself to the present arrangement, which is a rectangular bar with 90 deg. groove machined along its full length. One end of the groove is located and fastened by two screws to the top and rear side of headstock, and the tailstock takes its register in the remaining portion of the groove. A slot machined through top of bar enables the tailstock to be locked in any position along the bar. Both screw and lever tailstocks are fitted. The photographs show how the tailstocks are applied.

One cannot claim that this method is as rigid as the normal lathe bed with tailstock fitted, but very satisfactory results are obtained up to the



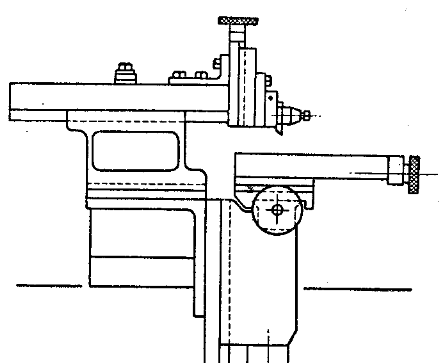
Drilling attachment

machine's capacity, which is $2\frac{5}{8}$ in. diameter and 9 in. long between centres.

A further modification to the tailstock bar enabled a 4-in. diameter faceplate and chuck to be accommodated on the headstock spindle.

With the tailstock bar removed, a maximum diameter of $6\frac{3}{4}$ in. can be machined on the faceplate, clearance over work table being obtained by adjusting the vertical traverse, which is approximately $3\frac{1}{2}$ in.

The idea adopted for screwcutting is unorthodox, but works quite well in operation. The guide-screw and change-wheels are carried on a bracket fastened to the front face of the headstock, which is able to traverse for a distance of 2 in. along its base slide, on which is carried the nut for guide-screw. Thus the head and tailstock with work in position are traversed past the tool, a reversal of the usual practice.



Shaping attachment

One advantage of the above method that is, when used as a boring machine, threads can be cut internally and externally with work remaining stationary on table. The photograph shows set-up for boring with adjustable boring tool in headstock spindle. A micrometer attachment is fitted to cross-slide for spacing when machining jigs, etc. Samples of small i.c. engine parts machined on this tool are also shown in this photograph.

The rear end view of machine with drive to headstock spindle and change wheels mounted for screwcutting is shown in another photograph.

A small dividing head was the next item of equipment to be made, as shown in the photograph. This has proved a very useful fixture for the machining of tap flutes, cutters, splines and keyways. The vertical drilling attachment 0 to ¼ in. capacity followed, and when in use is mounted on the slide which normally carries the headstock. There are no special features in this attachment other than it is self-contained and driven by the same belt and pulley as the headstock spindle.

Small vertical milling operations have been done with this attachment by locking the pulley on spindle in a fixed position, using vertical traverse on knee slide to adjust depth of cut and the cross and longitudinal traverse for spacing.

The scope of the machine was carried a stage further by fitting a shaping attachment which takes the same position on slide as the drilling and headstock attachments, and uses the traverses common to all the attachments. The shaping attachment has a 5-in. travel of ram and 4¾ in. depth can be accommodated under tool with a cross traverse of 4 in.

About ten years have been occupied in the building of this tool, but the problems met and surmounted have given great pleasure and a wealth of experience.

If any further additions are made, I think the first one will be to mount the attachment on a fabricated stand and give it that engineering look so pleasant to the eye.

A Simple Regulator

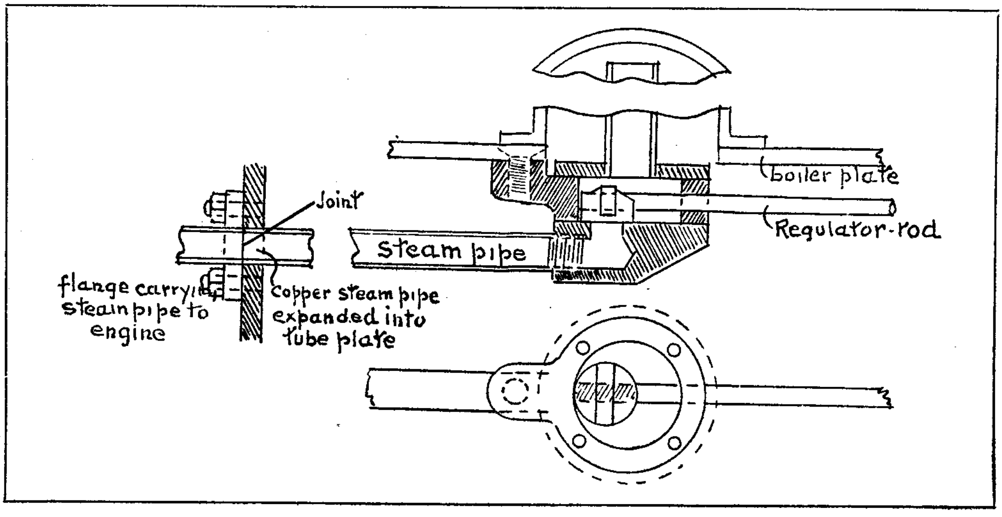
by R. A. Briggs

LOOKING at "L.B.S.C.'s" regulator arrangement in THE MODEL ENGINEER for November 2nd last, has tempted me to send a sketch of the one I made for my 10¼-in. gauge locomotive, now some 45 years old and still going strong. Some 12 years ago I fitted a new boiler (stayless, of course) and the original regulator went back, the only addition being a rustless-steel rod, replacing a mild-steel one.

The only moving part is the valve. It will be noticed that steam is taken from the actual top of the dome, and I do not think that any steam passes the rod, as the pressures on the inside joint are the same.

Note the simple arrangement for the joint on the tube plate. I always take short cuts wherever possible, both in working and walking, it saves time.

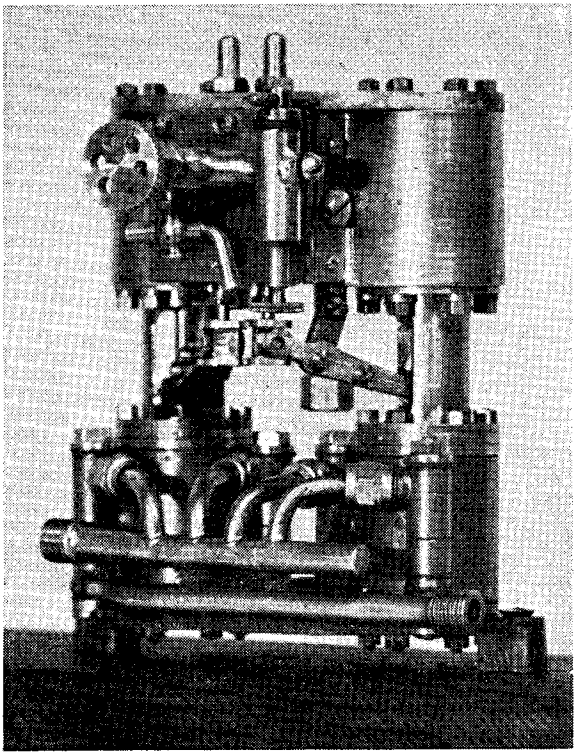
I have been a reader of THE MODEL ENGINEER from No. 1. The first copy was brought to me by my old friend Mr. Dawbarn, of the firm of Dawbarn & Ward, who were the "M.E.'s" first publishers, then in Farringdon Avenue, London. I am in my 83rd year.



*TWIN SISTERS

by J. I. Austen-Walton

Two 5-in. gauge locomotives, exactly alike externally but very different internally



Back view of Mr. Edds' model feed pump

THE last time I went to press, readers must have felt that I had only bad news to tell ; I refer to the trouble with *Centaur*, of course. That is over and done with, and a very ugly situation has become just a bad memory.

This time, I have good and interesting news—and pictures which will explain themselves. Mr. C. E. Edds, of Exeter, has sent these pictures of the steam pump described recently, and which he has built. Congratulations, Mr. Edds, on a very fine job indeed, and this is what he says about the building and testing of it :—

" It has given me much pleasure in building and testing it. You will notice I have altered the pipe work a little and also fitted a combined control valve and displacement lubricator—I was unable to get a piece of stainless steel for the port face, hence the lubricator." (A few complimentary remarks here, which I will leave out) ; he goes on—" I have tested it on air from 75 lb. to 10 lb., down to 80 strokes a minute. On wet steam it was jerky or intermittent so I fitted the steam inlet in the valve-chest cover, and a pet-cock to get rid of the condensate."

This type of pump may be a bit jerky when running light, but as soon as it has work to do, it will become as silent and docile as a clock working. Many readers have written in a similar strain, but all tell of their complete satisfaction in the final working of the job ; some have told me off for saying that it was a tricky bit of work to carry out, adding that everything went together according to plan. One or two others have asked me whether the pump had anything to do with the " Sisters," and I have replied in the affirmative—I thought this was generally understood, but in case there is still some doubt in readers minds, this is the position. The pump is an optional feature, but one that I can recommend thoroughly for those builders who intend to use their engines seriously, and wish to be quite definitely free from water feed troubles when on the track. It has no counterpart in the prototype ; that is why I made it an optional feature, and I felt that some of the " true to type " fraternity might object.

And to deal with another query as to the intended position of the pump on the engine, I will show it on the right-hand (or 6-ft. side) of the engine, in the space immediately in front of the side tank. Although the pump, when seen separately, looks quite a large affair, when bolted to the running board it will not come up to the level of the handrail or project unduly in any direction.

Other Queries

One or two builders have got into slight difficulties with the lining up of cylinders, guide-bars and motion-plates. I have written off to all these, but still feel that some extra words on the subject might help.

Most of you will have, at some time or other,

*Continued from page 216, " M.E.," February 8, 1951.

read a standard instruction book relating to some piece of intricate machinery, and in which it is usual to find a form of chart, showing how to trace faults by a system of elimination. In a car instruction book, it usually reads :—" If the engine fails to start, see that there is a supply of petrol in the tank." Believe it or not, there have been many motorists who have kicked themselves all round the garage for having been caught out on question No. 1.

Now, let's get to work. Check up on your cylinders for the following points :—Are you sure that the cylinder bores are true to the back, or bolting face of the block ? This is one of the most important things of all.

Are you sure that the faced ends of the cylinders are at right-angles to the bore ? To check, mount up on a *perfectly true running mandrel*, and machine again if necessary. The extra metal taken off can be made good with a packing washer, which measure, untidy as it is, will be much better than an untrue face.

Are you sure that the back covers of the cylinders have bores true to the turned spigot behind the cover, where it locates in the bore, and that these fit in the bores without shake ? The best remedy here is to make new covers, and take extra care in making them.

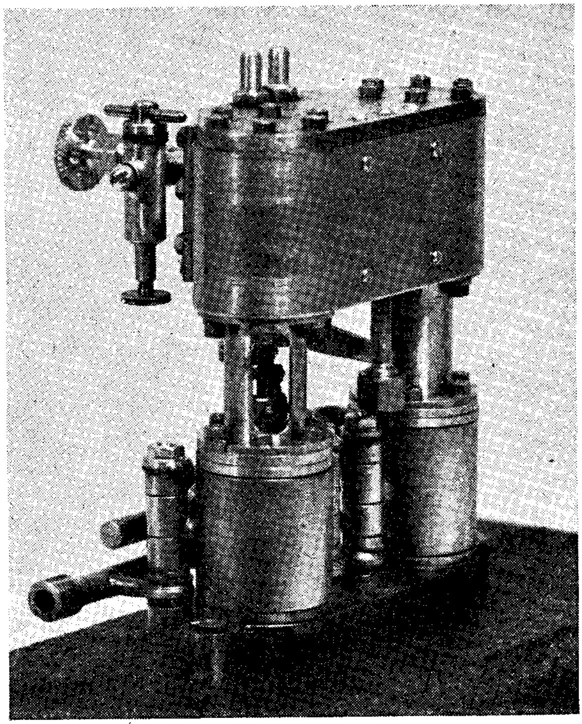
Are you sure that the piston-rods are straight, round, and of equal diameter all the way along ? The remedy here is to make new rods to fill these requirements.

Are you sure that the pistons run truly on their rods, and don't " throw " or " waggle " when the rod is rotated on its own axis ?

If you can give a good, conscientious " yes " to all the above (without old man " Conscience " giving you a sly dig in the ribs when you say it), then you should be able to assemble rods, pistons, covers and cylinders, with pistons packed or ringed, and glands packed, and to slide the piston up and down the entire stroke with a nice even movement, with no trace of hardness at either extremity, nor should it require more than the light application of two fingers on the piston-rod to do it. Tightness at one end of the stroke will denote one of two things ; if the tightness is felt when the piston-rod is pushed right *in*, then the chances are that the bore is not parallel. But if a similar tightness is felt when the rod is withdrawn, it might also mean that the piston is not true with the rod, or that the gland bore of the back cover is still amiss.

The back covers carry the pockets for the guide bars, and the seating faces of the pockets should be equidistant from the cover bore. If *not* equidistant, it is better to have these *under* the dimensions given, which will enable you to pack out the bars to suit ; this is not altogether a bad point, as it gives room for future adjustments when or if wear takes place—they do so on the prototype.

The pockets may also be out of line in the other plane, that is to say, the top and bottom bars may not come directly above and below the centre-line of the cover, which, in turn, will entail either reducing the width of the bars locally in their pockets, to correct the error, or doing funny things with the crossheads ; I don't recommend this, because you may run into other troubles in the matter of clearances, which are very small indeed in this case. The best way of making sure of this part of the mechanism is to get the crossheads right first of all, and to fit them to the piston-rods. When this has been done, the guide-bars should be trimmed to run freely in their respective crosshead slippers, and marked to make quite sure of their not being reversed by mistake. If they are clamped gently to the crosshead, by one toolmaker's clamp over the three parts, you can then measure over the outside faces of the rods to make sure that they run parallel to each other—failure to do so showing that the slipper portions of the crosshead itself are not true. When this further error has been corrected, and the bars are again clamped on, by pushing the crosshead towards the back cylinder cover, the bars will come to rest *where they ought to be*. This is the time to settle packing thicknesses or alterations to the front ends of the bars or the trimming out of the actual pockets.



Front view of the model feed pump

When these last things have been done, you should still be able to slide the piston-rod back and forth, without any *appreciable extra effort*.

Extra Care Dept.

The fitting of the motion-plate to the other ends of the guide-bars, is more than just holding them apart at the right spacing ; a good deal of the up and down thrust, derived from the connecting-rod's angular movement, is resisted by the motion-plate, and it must be correctly and firmly fitted. Failure to do so will reintroduce binding on the piston and piston-rod when the engine is working hard—a fact that might well be overlooked when just pushing the locomotive along a short section of rail, to see if everything is quite free. The evil derived from this weakness is at least twofold ; first, it will cause excessive wear in the cylinder bore and piston, and reduce the power of the engine, and secondly, it will prevent your maintaining anything like good and reliable valve timing, with so much of the gear springing out of line under the strain.

Let us face facts. If we are going to incorporate a certain part in an engine, then let us make sure that it at least does its job *efficiently*. But there are still other considerations having a bearing on the motion-plate and its fixing. First of all, it provides a mounting for the expansion-link bearings, and the dimensions I am giving you for the various parts of the valve-gear would not be worth the paper they are printed on, if you neglected to position the foundations correctly. The motion-plate is really the foundation on this type of engine, so we must see that it is fixed *vertically* on the frames, at the correct distance from the back face of the cylinder, and not forcing the guide-bars up, down, or in any way from the true path described by the crosshead in its straightforward movement—to and fro.

Therefore, see that the motion-plate is fitted to the guide-bars the correct distance from the cylinder face, and in the truly vertical plane, and having done so, make the following test :—With the cylinder, guide-bar, and motion-plate assembly all made and bolted up, lay the unit on a perfectly flat surface, like a surface or marking-off plate, and if possible—clamp the cylinder portion down firmly. Theoretically, the back face of the motion-plate should now lie flat on the table, but it may *not* do so ; you may be able to see light under it, or it may want to settle down before the cylinder face. In the latter case, put a thin, even shim of metal under the cylinder, and again clamp down ; if this seems to cure the error, clamp the motion plate down as well, and see if you can slide the crosshead to and from with as little effort as when the unit was " free." If the unit becomes unduly stiff in the test, then you have failed to find the right packing ; and do not forget that the machining of the cylinder allows for a 16-gauge plate shim to be fitted in any case, so shimming at this end must be over and above this plate, but *not* under. By this I mean that if the cure seems to call for a reduction of packing behind the cylinder, then transfer your correcting tactics to the motion-plate end only, either reducing the motion-plate itself, or, if the error is in the other direction, by inserting simple packing plates. If all this has not scared you to death, let me deal the death blow by telling you that the packing required may not even be uniform ; you might need to taper the shims to avoid twisting the motion-plate. But here, if possible, I would try to trim the back face of the motion-plate first, rather than get mixed up with tapering metal shims. Let us assume you now have obtained desired results with both cylinder and motion-plate fixed down, and free running secured. The next job is to transfer the units to the engine frames, clamping first, and drilling and bolting afterwards ; and this time taking still another precaution—that of seeing that the guide-bars lie parallel to the top edge of the frames ; you stand back, admiring your handiwork, and wiping your hands on a piece of rag, handkerchief, or shirt front, and feeling that you have done a good job. After all, you can now slide the cross-head to and fro without any bind . . . Oh, dash it all ! Now it has gone all stiff again. Well, it was all right on the table, so it ought to be all right now. And this is where I butt in—I'm sorry, old man—your frames can't be quite flat—there's no getting away from it.

The only thing now is to straighten the frame member, if the bend is at all visible, but if a straight-edge held alongside the frames gives only a bare indication of being out, then it might be possible to alter the packing pieces once more, in order to cover such a slight error.

I do not feel that I am wasting space by giving all this dope, but rather the opposite. One might well apply such hints to the building of any type of engine, and by following these or similar hints you would be sure to get satisfactory results.

Just to carry this to a satisfactory conclusion as well, I am going to mention the fitting of the expansion-link brackets or bearings to the motion-plate itself. Please do not forget that here we are tied up with two more important dimensions—the centre height of the bearings above the guide-bars (or cylinder centre-line), and the centre distance from these bearings to the back face of the motion-plate.

I am just now clearing a new drawing, showing the last few parts of the valve-gear, other than the lifting links and cross-shaft, which will come next. The drawing mentioned will include guide-bars, radius-rod, expansion-link, union-link, combination lever, eccentric-rod, and return crank, all of which should mean a mighty spell of hard work, but I am more than anxious just now, to get a really brisk move forward, and not keep builders waiting about for information. Life is not made too easy for us these days, and I have been unable to get out in the workshop for some time—all due to lack of fuel. It is too big a place to heat electrically, and I will not use gas, for price and other reasons.

The Big Problem

I still learn of fresh builders coming to join our ranks, and one or two have asked for alternative materials for such things as axleboxes, horn cheeks and so on. You all know the difficulties surrounding the supply of gunmetal and brass, both from the price and official angle, and I am beginning to think that the old scrap-box is going to become one's most cherished possession.

The average model engineer is a resourceful fellow, and the number of odd models I have seen made from parts of a fire engine, has made me

(*Continued on page* 571)

IN THE WORKSHOP

by "Duplex"

88.—Actuating the Leadscrew Dog-clutch fitted to the $3\frac{1}{2}$-in. Drummond Lathe

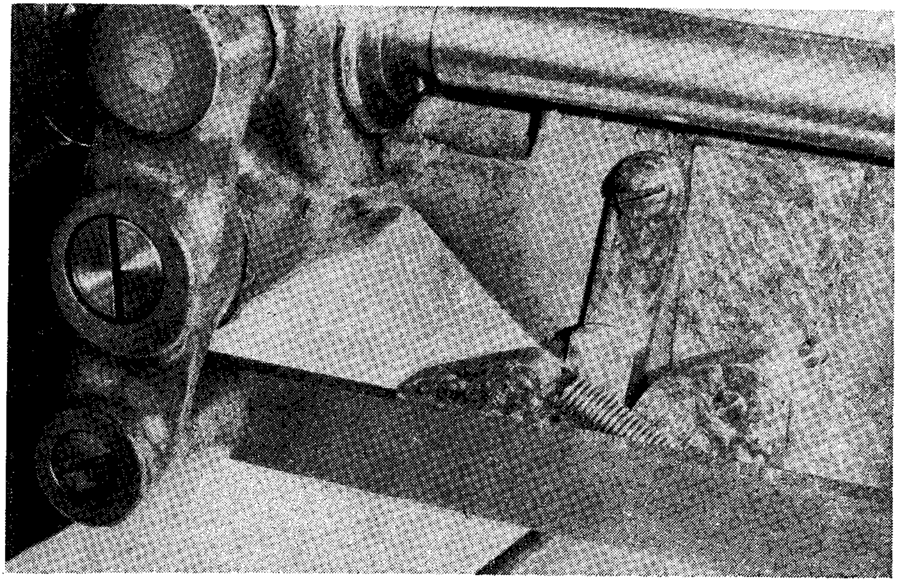


Fig. 1. *The dog-clutch control fitted to the lathe*

THE alternative method of disengaging the automatic saddle traverse in this lathe is by means of a dog-clutch, fitted to the leadscrew and operated by a control bar attached to links at either end of the lathe bed. When engaging the dog-clutch, the knob fitted to the control bar is moved towards the right, and pressure must be maintained until the clutch dogs come into line and so can be meshed. With a fine feed in use and the leadscrew turning slowly it may be found tedious to have to keep pressing on the control knob until the leadscrew has, perhaps, made nearly a full revolution; moreover, in some circumstances, difficulty may be experienced in releasing the clutch

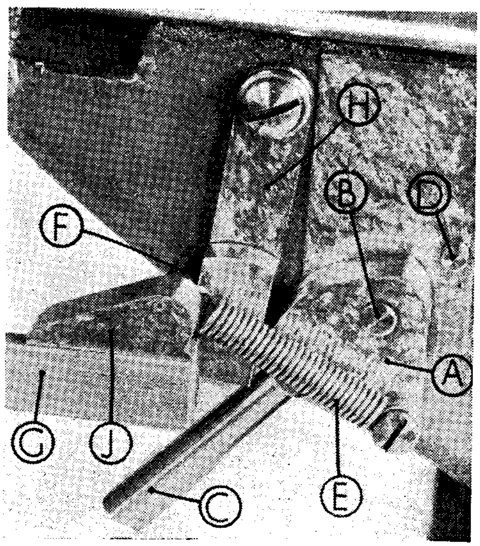


Fig. 2. *The dog-clutch disengaged.* "*A*"—*the cam*; "*B*"—*the cam pivot*; "*C*"—*the control lever*; "*D*"—*the stop-pin*; "*E*"—*the actuating spring*; "*F*"—*the spring attachment*; "*G*"—*the control bar*; "*H*"—*the cam follower*; "*J*"—*the spring bracket*

exactly when required. This dog-clutch is particularly useful when turning up to a shoulder and measuring the distance machined along the work from the leadscrew index; for, when the shoulder has been nearly reached, the dog-clutch is disengaged and the machining is finished by hand feeding. Where no dog-clutch is fitted and the feed is stopped by releasing the leadscrew nut, the leadscrew index will no longer serve as a guide for machining to an exact length. Alternatively, hand-feeding from the leadscrew can be retained if the lathe is stopped and the gear train is disconnected by putting the cluster gear in the neutral position.

To simplify the control of the dog-clutch,

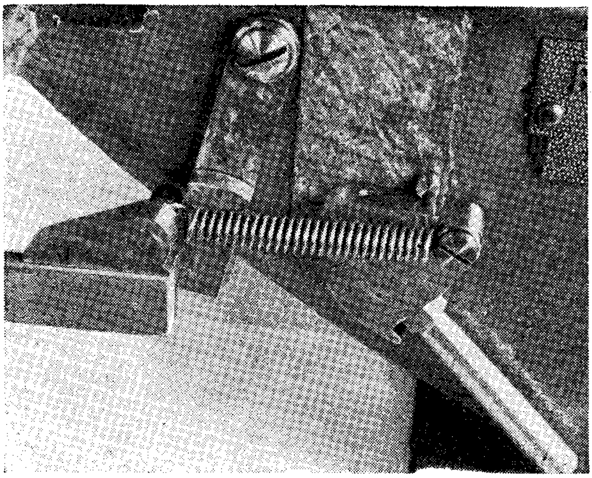


Fig. 3. *The mechanism set to engage the dog-clutch*

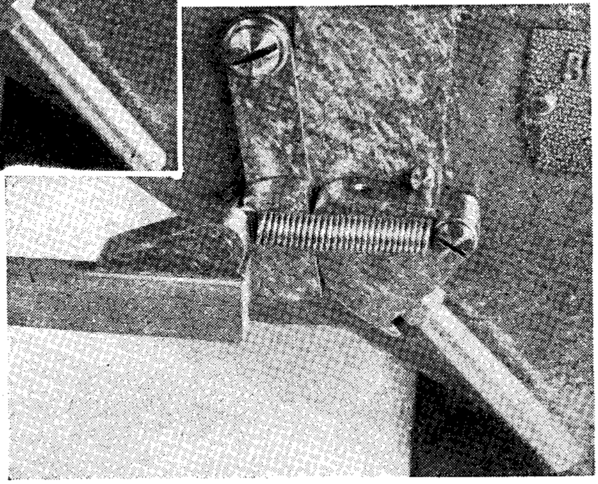


Fig. 4. *The dog-clutch engaged*

it was decided to make the working automatic by means of a spring-actuated mechanism moving the control bar. Where this device is fitted, no difficulty will be found in disengaging the clutch, even when a heavy cut is being taken; for, instead of hand pressure being directly applied, a mechanical advantage of approximately 7 to 1 is gained, which enables the small operating lever to be moved by a touch of the finger. The action of the device will, perhaps be made clear by reference to the photographs, where the ordinary control bar has been replaced by a short piece of material, so as to expose the working parts. The cam, *A*, rotates on the pivot, *B*, so that when the lever, *C*, is moved to the right to bring the cam against its stop pin, *D*, the spring, *E*, is put in tension and will pull the stud, *F*, attached to the control bar, *G*, in this direction, thus engaging the clutch with a click as soon as the dogs come into line. The cam-follower, *H*, acts as a stop in limiting the movement of the bar towards the right.

To release the dog-clutch, the lever, *C*, is pushed over to the left and the cam, *A*, through the follower, *H*, will force the stud, *F*, and the control bar, *G*, in the same direction. The lower end of the follower, *H*, then prevents further rotation of the cam towards the left. It will be seen that, owing to the toggle action, the mechanism is securely locked when the dog-clutch is engaged; also, the tension of the spring will keep the clutch from moving when in the disengaged position. The cam profile is shaped to give the control bar a range of movement of $\frac{7}{16}$ in., which is sufficient for the full engagement and release of the clutch dogs. If the standard automatic clutch throw-out is to be used, it is only necessary to disconnect the spring at one end to enable this mechanism to operate in the normal manner.

As shown in the drawing (Fig. 5) the cam pivot, *B*, and the stop-pin, *D*, are located on the rectangular, flat surface machined by the manufacturers on the lathe bed casting, but the pivot screw of the follower, *H*, lies to the left of this surface. The holes to receive these components were drilled by using a drilling machine headstock in the manner illustrated in Fig. 6, and driving the machine by belt from the lathe chuck. In this way, the holes were

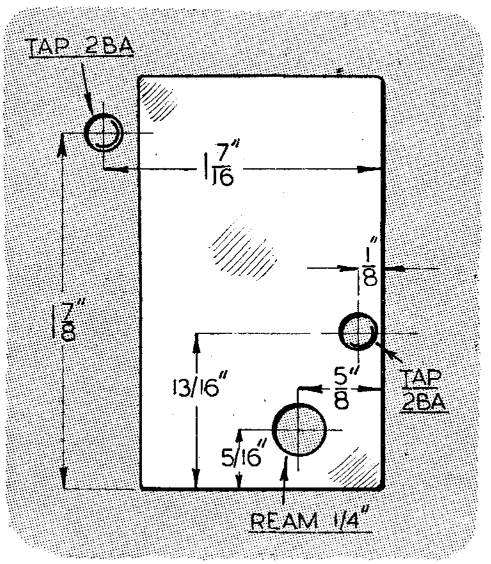


Fig. 5. *Marking-out the machined surface on the lathe bed casting*

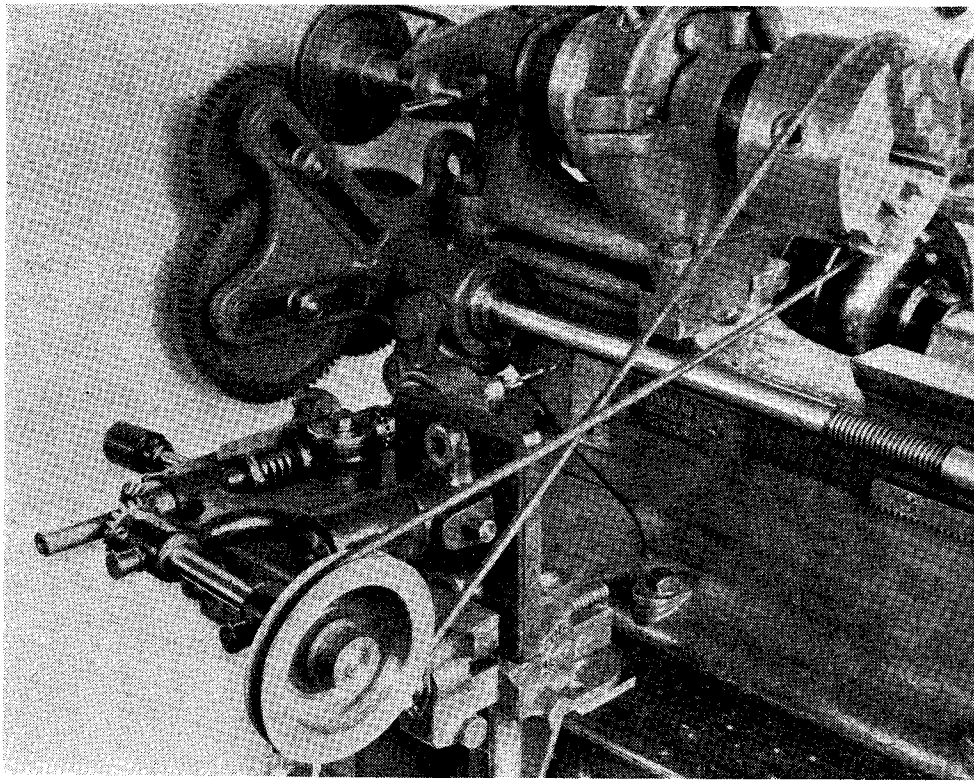


Fig. 6. Method of drilling the bed casting

formed truly square with the working surface.

The cam is marked-out and shaped in accordance with the diagram in Fig. 7 and, at the same time, the dimensions given in the working drawings are taken into account. When the cam rests against its stop-pin, the direction of the spring's pull is along the line *CA* (Fig. 7) which lies a little above the pivot centre *B*, in order to give a toggle action when the spring is put in tension for engaging the dog-clutch. *D* represents the point of contact with the cam-follower, when the cam forces the dog-clutch into the free position, as the control handle is moved through approximately 90 deg. As the length of the radius *AB* equals $\frac{5}{16}$ in., and the range of movement required is $\frac{7}{16}$ in., the dimension *BD* is made $\frac{3}{4}$ in. Apart from observing these dimensions, the exact profile of the cam face is unimportant; but, to afford smooth working, this surface should form an arc of a circle having its centre near to *C*. After the parts have been assembled, the toe of the cam below the point *D* can, if necessary, be shaped to make more even contact with the cam-follower. The pivot is made a light press fit in the cam and is then secured in place with a grub-screw.

At its other end the pivot is furnished with a spring-washer and nut to give frictional control of the pivot as it turns in the lathe bed casting. The cam and its follower may be case-hardened, but as these parts have broad contact surfaces and tend to roll together, they are little subjected to wear and can safely be left unhardened; in fact, this mechanism was assembled, in the

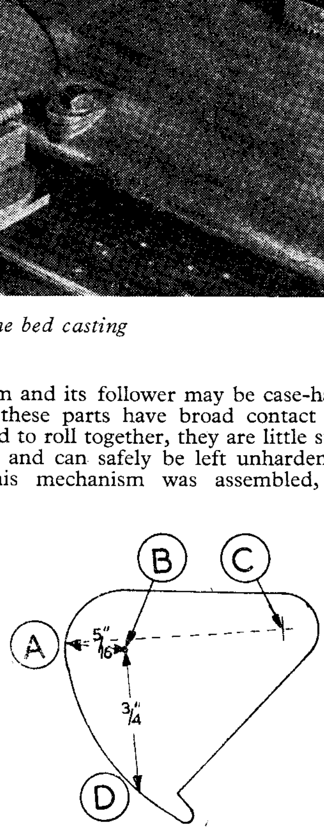


Fig. 7. Dimensions for marking-out the cam

unhardened state, for trial more than ten years ago, and so it has remained without needing attention.

When fitting the spring attachment bracket, *J*, it is best, first, to assemble the mechanism, and

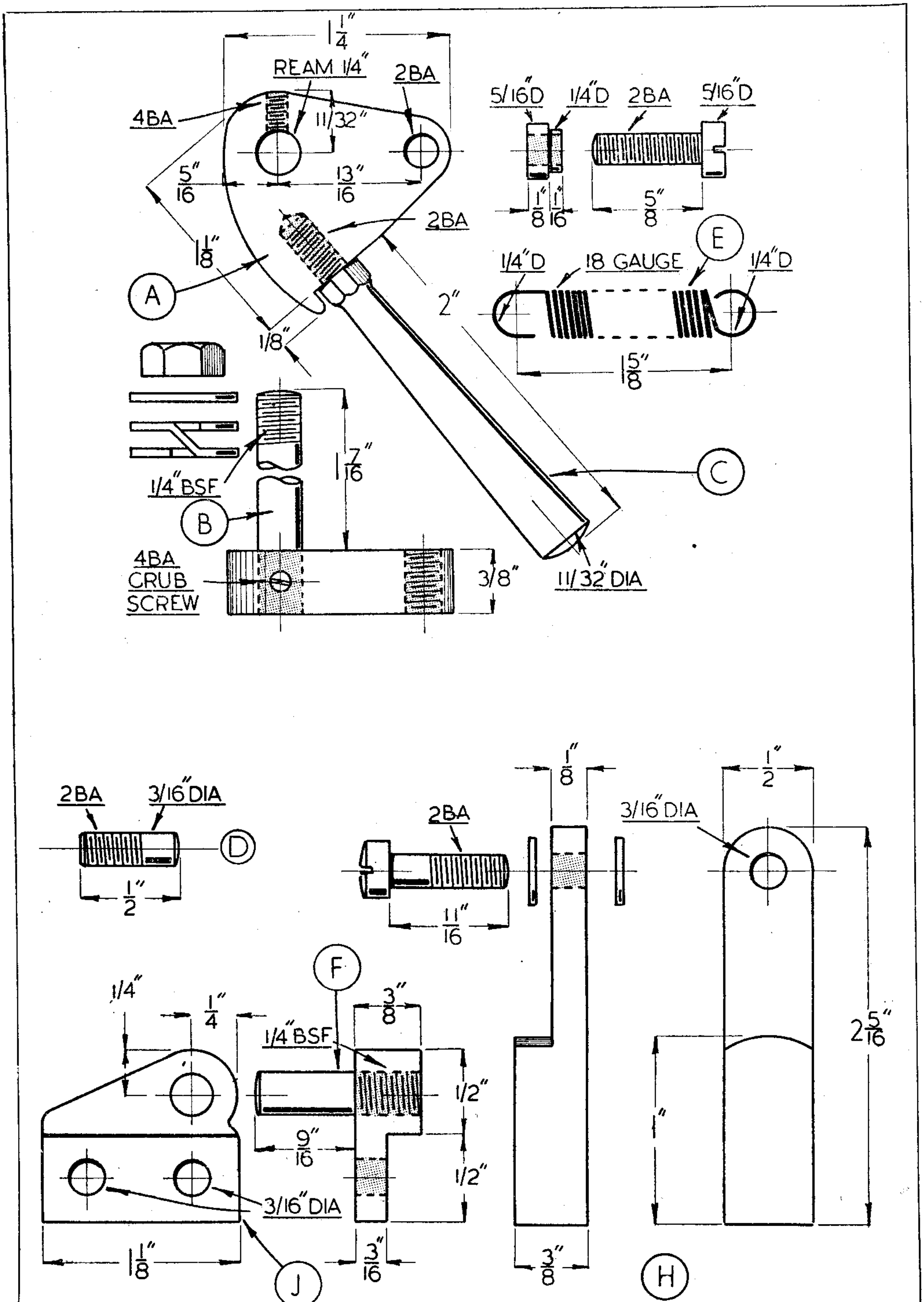

1 1/4"
REAM 1/4"
2BA
4BA
11/32"
5/16"
13/16"
1 1/8"
2BA
A
2"
1/8"
1/4" BSF
1 7/16"
B
C
4BA
GRUB
SCREW
3/8"
11/32" DIA
5/16D
1/4"D
2BA
5/16"D
1/8"
1/16"
5/8"
E
1/4"D
18 GAUGE
1/4"D
1 5/8"
2BA
3/16" DIA
D
1/2"
2BA
11/16"
1/8"
3/16" DIA
1/2"
2 5/16"
1"
3/8"
H
F
1/4"
1/4"
1/4" BSF
3/8"
1/2"
1/2"
9/16"
3/16" DIA
1 1/8"
3/16"
J

Fig. 8

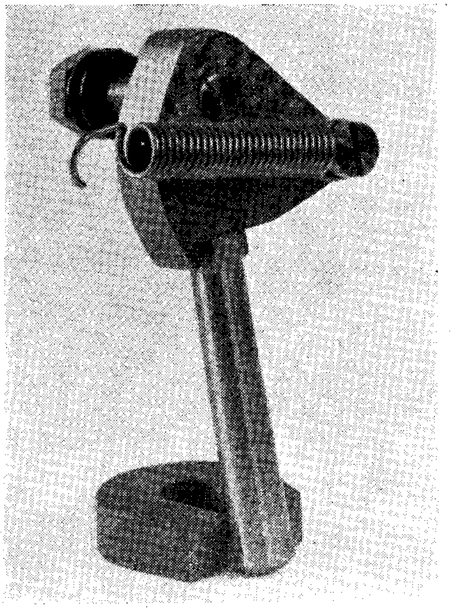


Fig. 9. *The cam with its spring*

then to find the correct position for the bracket by securing it to the control bar with a toolmaker's clamp.

The spring should be in light tension with the dog-clutch disengaged and, when the cam is rotated against its stop-pin, the spring tension must be fully sufficient to pull the dog-clutch into engagement. The bracket can then be permanently attached by means of two studs screwed into the bar and fitted with nuts on the far side.

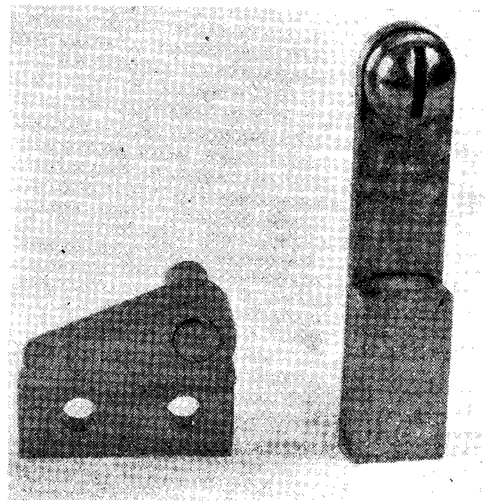


Fig. 10. *Left—the spring bracket. Right—the cam follower*

If, when finally assembling the mechanism, all bearing surfaces are given a little thin grease, no further lubrication will be required until after prolonged use.

Twin Sisters

(*Continued from page* 566)

wonder whether that excellent service is not running its equipment about in a badly depleted condition. And there are other useful sources of supply—very hush-hush and mysterious, of course, all of which makes me feel that if a fellow wants to build a locomotive, then nothing in this world is going to stop him ; but let us deal with our own problem. Axleboxes could be mild-steel —especially the roller-bearing variety, and the plain boxes just bushed. Horn cheeks in cast-iron are excellent, better in many ways than gunmetal, *except* for the ever-present rust trouble ; but there's always paint and careful after-use cleaning to counter it. Cylinders are always a good bet in cast-iron, and better still in Meehanite (I hope to have some good news soon, about the latter). Motion-plates, if handled and machined with the necessary care, would stand up to the stress and strain, but the silver-soldering on of additional parts would be the bogey. If anyone is really interested in this particular item in cast-iron, and cares to let me know, I will try to work out a satisfactory alternative treatment. Steamchests would be satisfactory in cast-iron ; after all, if cylinders are O.K., then why not the chests ?

But the biggest problem of all is, undoubtedly, the boiler. If it were possible to get galvanising done, the welded steel boiler would be the obvious answer, and as alternative protective treatments are nearly all, if not all, based on zinc coating in some form, which forms the basis of the present shortage and difficulty, it is difficult to see a way out. Fortunately for us, the building of a boiler is not a weekly, monthly, or perhaps a yearly occurrence with the average man, and I am glad I was able to give advance information in this direction, to enable the far-seeing builder to get his stock built up before it was too late.

Thank You So Much

Thanks to all those who wrote to ask me how I was getting on, after my recent illness. I am beginning to feel that if only I could get a spot of sunlight and some warmer weather to go with it, I might recapture some of my former energy and pep. So, once again, thanks for asking, and meanwhile—on with the " Sisters."

(*To be continued*)

A HARMONOGRAPH

by S. F. Weston

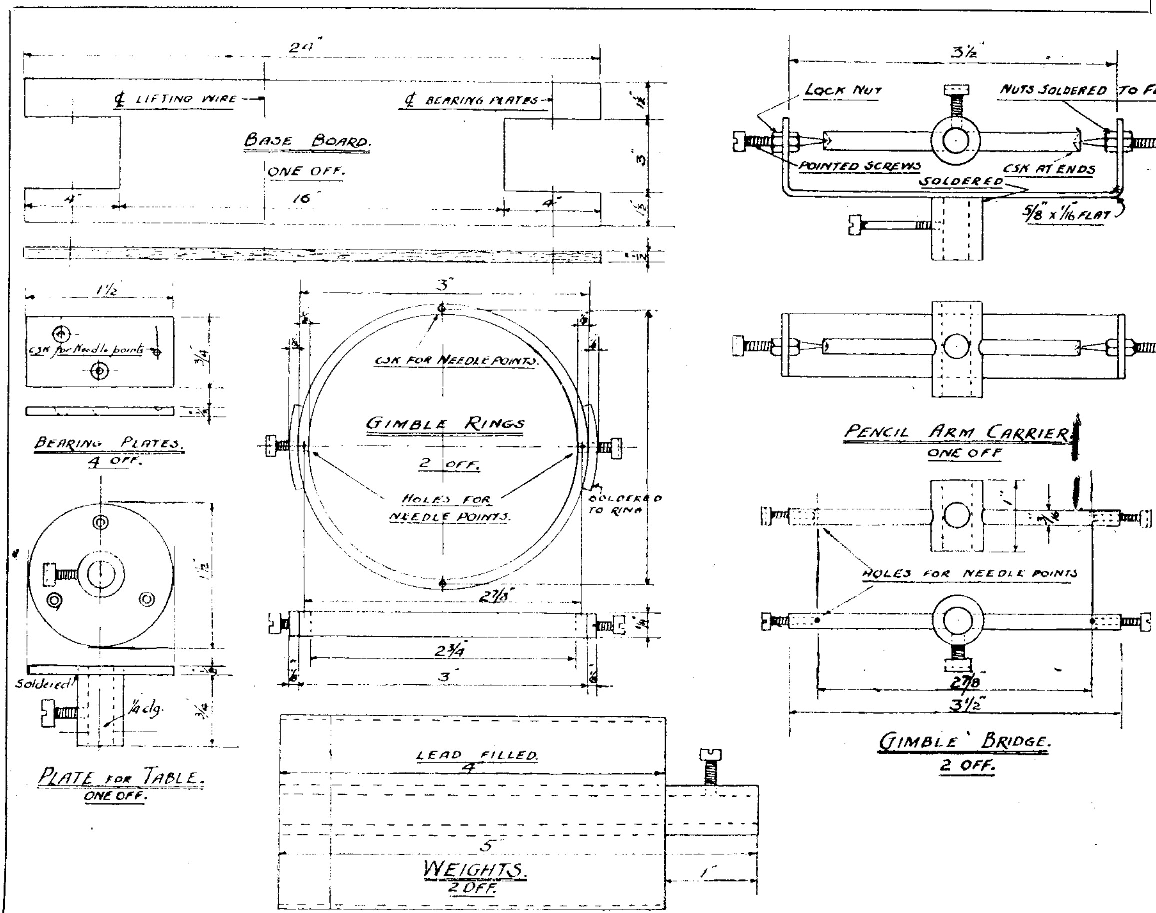
HARMONOGRAPHS can be of various types. The one shown in the accompanying sketches is operated by two pendulums, but they can be designed to be hand-operated by means of a handle actuating pulleys connected by a light belt, by toothed gearing and by worm gears, etc. The last-mentioned types give symmetrical designs if continued for the complete circle and the results are somewhat of the nature of an engine-turned watch case. See diagram *A* where the full diagram is completed ; in *B* the table was given six revolutions only.

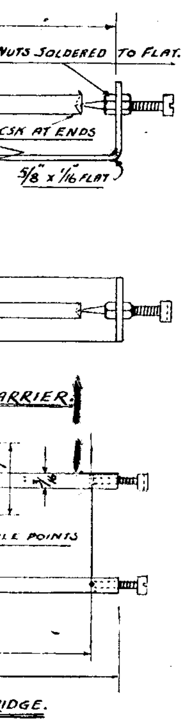
The pendulum arrangement detailed by the sketches gives designs of varying shapes, the curves diminishing in regular cadence as the swing of the pendulums gradually becomes shorter until the pencil comes to rest. Diagrams *C*, *D* and *E*.

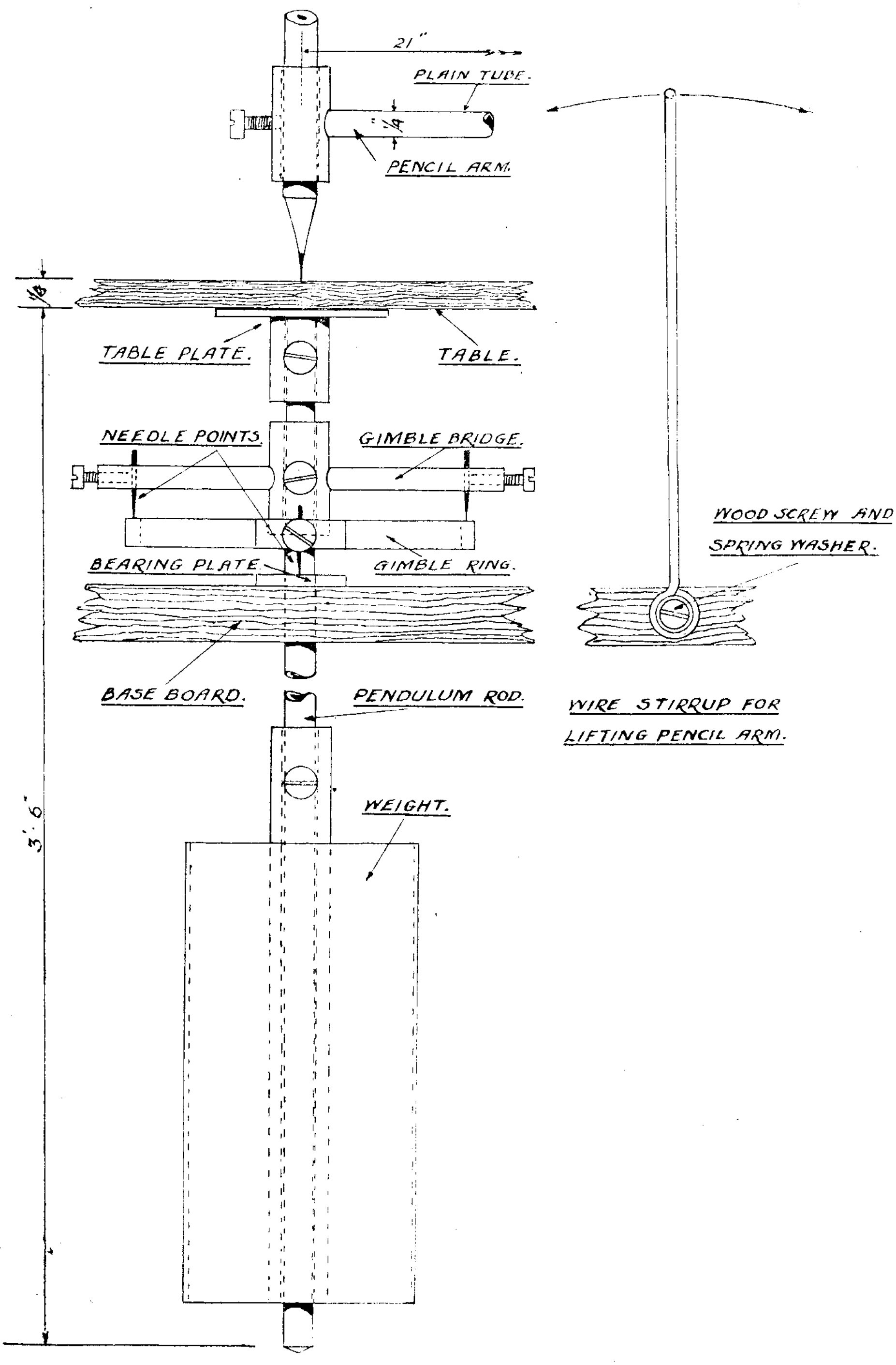
To make this type, a baseboard about 6 in. wide by 2 ft. 6 in. long by ½ in. thick is cut away at each end, as shown, to accommodate the suspension of the two pendulums. The latter are both similar and consist of a 3 ft. 6 in. length of brass tube, ¼ in. outside diameter, each being fitted with an adjustable weight.

The weights are made from a 4 in. length of 2 in. brass tube filled with lead and arranged with a 5 in. length of ¼ in. clearing i.d. brass tube in the central position, the projecting portion being fitted with a set-screw for adjusting to varying heights on the pendulum-rod.

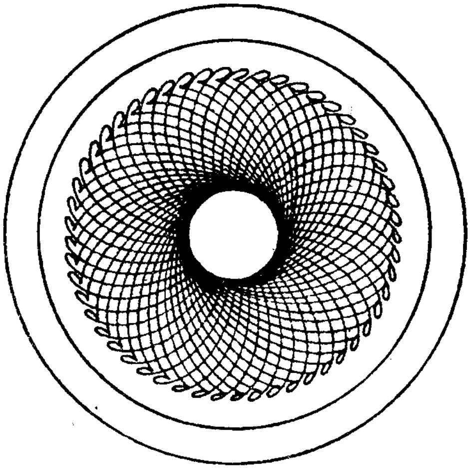
The suspension is of the gimbal type to allow

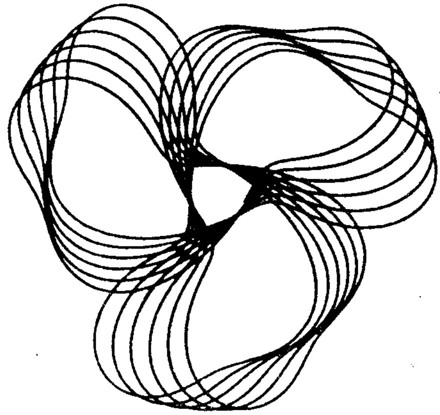



SOLDERED TO FLAT.
AT ENDS
5/8" x 1/16 FLAT

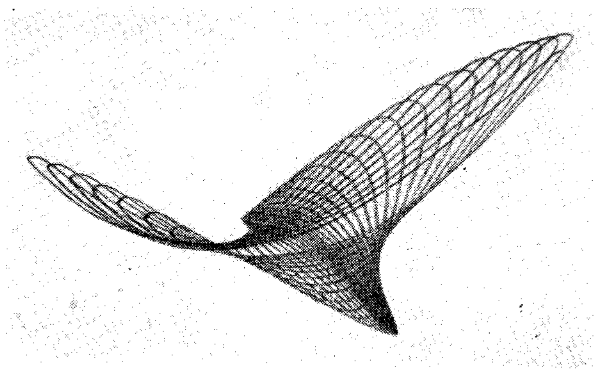

21"
PLAIN TUBE.
1/4"
PENCIL ARM.
1/8"
TABLE PLATE.
TABLE.
NEEDLE POINTS.
GIMBLE BRIDGE.
BEARING PLATE.
GIMBLE RING.
BASE BOARD.
PENDULUM ROD.
WEIGHT.
3' 6"
WOOD SCREW AND
SPRING WASHER.
WIRE STIRRUP FOR
LIFTING PENCIL ARM.

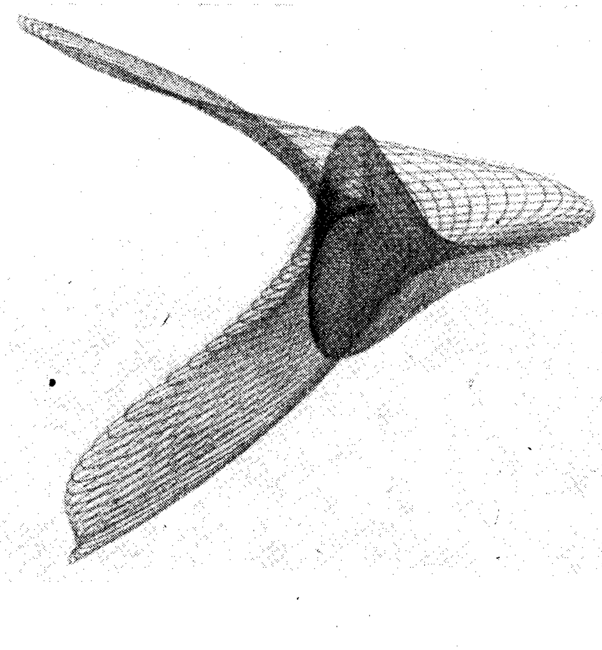
ASSEMBLY.





Above, left, diagram " A "; above, " B "; left, " C "; and below, " D "





the pendulum to swing in any direction. The sketches show how these are constructed; gramophone needles are used for the points.

The table on which the paper is carried is a piece of mahogany, ¼ in. thick by about 8 in. by 12 in., and the paper is held fast on this by means of stout rubber bands.

The pencil—or ball-point pen—is carried at one end of a light brass tube arm and this arm is carried at the actuating end by the arrangement shown. This keeps the pencil rigid and upright at the table end of the arm.

The diagrams are formed by swinging both pendulums and gently lowering the pencil into

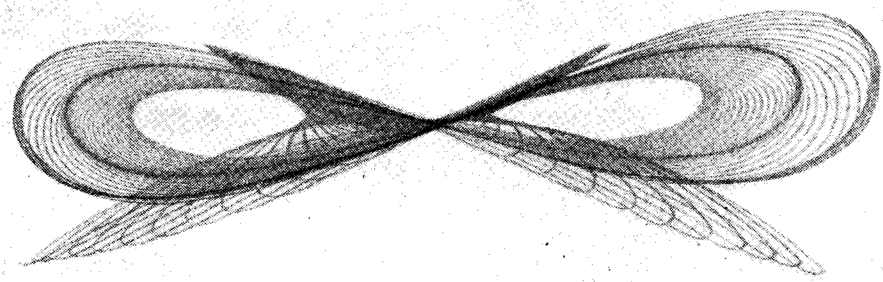


Diagram "E"

contact with the paper on the table. For this purpose a lifting and lowering arm is a great advantage. The pencil arm should be as light as possible, and may be of aluminium tube plugged with brass at the pencil end for the pencil attachment.

A Battery-Driven Traction Engine

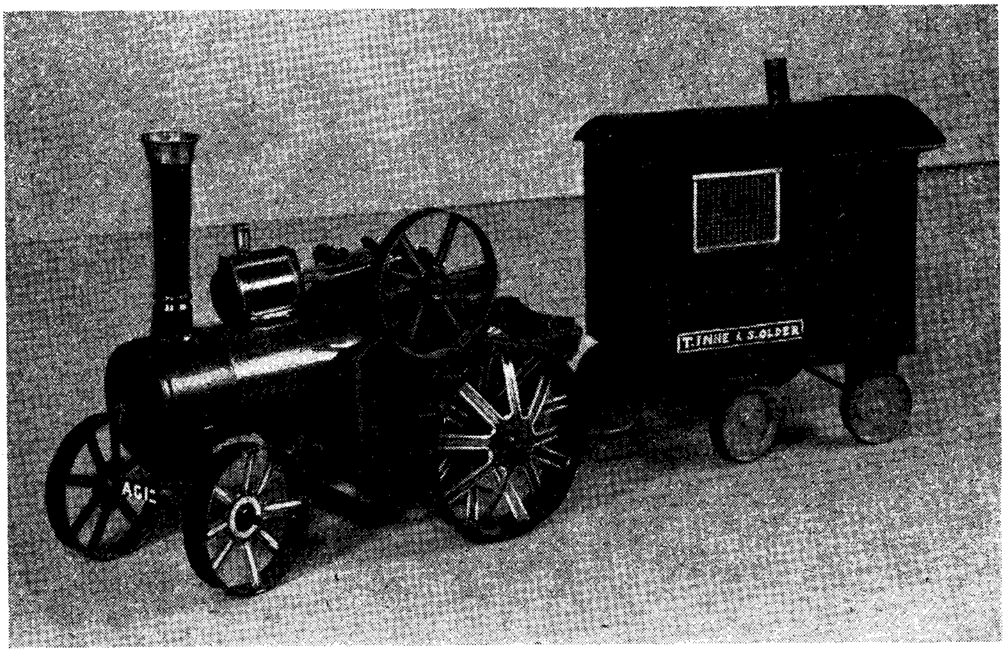


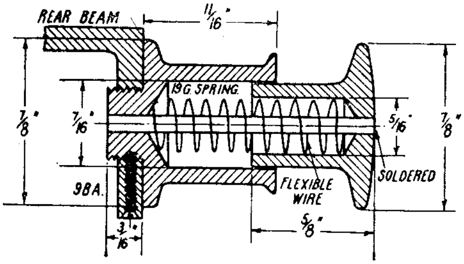
Photo by] *[The Florence Studio Ltd.*

This simple traction engine was built by Mr. J. C. Hool from cocoa tins, etc., hence the name on the tool shed—" Messrs. T. Inne & S. Older." Originally, batteries were housed in the boiler but are now carried in the tool shed, two $4\frac{1}{2}$ volt driving a rev. motor in the driver's cockpit. The drive is by means of a rubber band to the flywheel and thence via *the crankshaft to the road wheel on the offside*

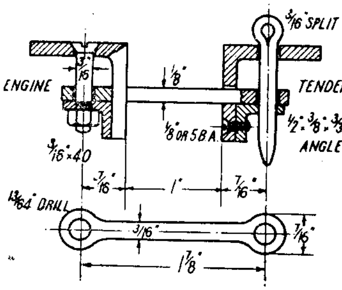
"PAMELA" by "L.B.S.C."

A $3\frac{1}{2}$-in. Gauge Rebuild of a Southern Pacific

As your humble servant believes in simplicity plus utility, there won't be anything in the way of superfluous trimmings on *Pamela's* tender. The buffers are of the same type as specified for the tenders of *Doris*, and one or two other engines; the type of buffer fitted to the engine is not suitable, on account of the spindle running foul of the tender frame just inside the beam. In place of the spindle and nut, a piece of flexible wire is used to prevent the head coming right out of the socket. The socket can be turned approximately the tapping size for $\frac{3}{8}$ in. × 26 or 32, whichever size you used to tap the holes in the beam. This will cut a clearance in the end of the frame, to accommodate the stub shank of the buffer. Run a plug tap in as far as it will go. Then screw the buffer in tightly; and to prevent any chance of it coming out, fit a 9-B.A. set-screw in the thickness of the beam, as shown. Drill the No. 53 hole right into the shank, tap 9 B.A., countersink the end, and put the screw in tightly.



Details of the tender buffers



Engine and tender coupling

from a piece of $\frac{7}{8}$ in. round rod; any metal will do. Maybe our advertisers can supply castings. It is machined same as the ones on the engine, but the stem is only $\frac{3}{16}$ in. long; and in place of the spindle hole, drill one just large enough to take the wire. Picture-wire will do, or a bit of stout electric flex with the insulation stripped off. The head is turned from $\frac{7}{8}$ in. round mild-steel, same dimensions as on the engine; but instead of having a spindle fitted, it is recessed as shown, by aid of a $\frac{5}{16}$-in. drill, to within $\frac{1}{8}$ in. of the end, finishing with a small hole, to take the other end of the wire. To assemble, poke one end of the flexible wire through the hole in the socket, and sweat it well in with solder. Put the spring into the head, and insert in socket, threading the wire through the hole in the head; easy enough if you have the wire plenty long to start with. Press the head about $\frac{1}{8}$ in. into the socket, pull the wire tight, sweat it in, cut off the surplus, and file flush. When the buffer is compressed, the wire just crumples up inside the socket and recess, and doesn't interfere with the buffing action; when released, the wire goes taut and prevents the head coming out. Inspector Meticulous says, why not mill a slot in the socket, and fit a pin through it into the sliding part of the head? You certainly can, if you so desire; but the above is easier, and it does the job, so what on earth is there to fret about?

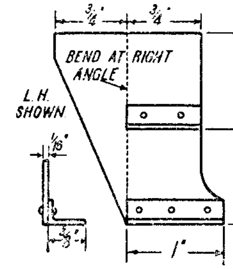
To fix the buffers to the beam, put a D-bit, or a rose cutter, down the tapped holes in the beam, for about $\frac{1}{8}$ in. depth. The bit should be

Couplings

The drawbar, hook, and screw coupling are exactly the same as fitted to the engine, so there is no need to dilate on that item; but if the engine is likely to be driven by any inexperienced person, it might be advisable to fit a longer shank and a little stronger spring to the drawbar. This will minimise the "snatching" effect when "Bro. Hamfist" operates the regulator in the manner usually observed among that section of the fraternity. I've seen 'em! The brake-pipe stand, and hose connection, is also similar to that on the engine, and fitted in the same way.

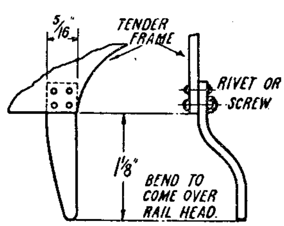
The coupling between engine and tender is just a plain link, filed up from flat mild-steel, to the shape and dimensions shown. Odd bits of frame steel come in handy for this sort of job. A bracket is required inside each beam; this is a piece of angle, of $\frac{1}{2}$ in. × $\frac{3}{8}$ in. section, and 3/32 in. thick. If unequal angle is unobtainable, use $\frac{1}{2}$ in. × $\frac{1}{2}$ in. and file away the surplus. Each piece is $\frac{3}{4}$ in. long, and attached to the beams by countersunk screws in the position shown. Drill a $\frac{3}{16}$-in. hole opposite the centre of the drawbar slots, right through the top of each beam—including the cab deck on the engine, and the soleplate on the tender—continuing down through the bracket. These holes should be $\frac{7}{16}$ in. from the outside of the beam, and the one on the engine should be countersunk. The drawbar is permanently fixed to the engine by a $\frac{3}{16}$-in. countersunk screw and nut, as shown, which can be turned from a bit of $\frac{5}{16}$-in. round mild-steel.

The countersunk head is necessary, to clear the ring of the pin that supports the grate. Quick disconnection of engine and tender is obtained by using an ordinary commercial $\frac{3}{16}$-in. split pin, or cotter pin, at the tender end of the drawbar, as shown in the illustration. If one is accidentally dropped in long grass by the side of the line, it isn't worth while looking for it! Far quicker to get a fresh one.



Tender step

Mention of the dumping-pin reminds me that this merchant, up to now, has been "lying naked and unashamed" across the cab deck; so we had better cover it up. All the L.B. & S.C. Railway engines had detachable wooden footboards; and the firemen invariably lifted them out, and swept all the coal-dust off the iron plate underneath, before leaving the depot, so that it wouldn't blow about when the engine was running. I'll bet very few present-day firemen would take that much trouble! Anyway, we can easily make a replica of the wooden footboard, by cutting a piece of thin plywood to fit nicely



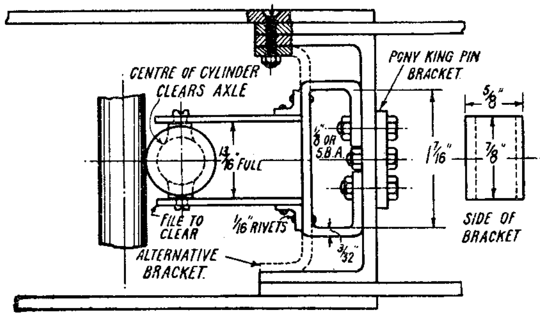
Guard iron

over the cab deck. Then attach two little battens to it, by aid of sprigs and glue, just thick enough to raise it high enough to clear the dump-pin, and allow same to be easily operated.

Steps, Handrails, and Guard Irons

The steps are made in the same way as those specified for the engine, and are attached in the same manner; the accompanying illustration gives the necessary dimensions. The handrails, or grab-irons, as they are usually called by the enginemen, are made and fitted in the same manner as those on the side of the engine cab. The length from bend to bend is approximately $2\frac{3}{4}$ in. and they are located $\frac{5}{16}$ in. from the front ends of the tender side sheets, in which holes are drilled at top and bottom, same as the engine cab. The bent-over ends of the grab-rail are then threaded, a tapped washer screwed on to each, the bends put through the holes in the tender sheet, and secured with a nut on the inner side.

The guard irons are cut to size and shape



Alternative fixing for brake cylinder

shown, from 3/32-in. steel. They are attached to the rear ends of the tender frame, in the position shown in the general arrangement drawing, by screws and nuts. Alternatively, they can be made at the same time as the frames, and riveted in position before the frames are erected. The ends of the guard irons will need setting in approximately $\frac{1}{2}$ in., so that they come over the rail heads when the tender is standing on a straight piece of line.

Amended Arrangement for Engine Brake Cylinder

A couple of *Pamela* builders have pointed out that if the cylinder for the steam brake is erected exactly as shown in a recent illustration, the levers at the bottom will run foul of the pony king-pin bracket. Quite right, they will. It is my fault for inadvertently checking against the wrong bracket drawing; but I guess if you saw the terrific pile of drawings I have here, you would say that there certainly was some excuse! How on earth I have ever managed to do them all, is beginning to puzzle me; like the children in the fairy tale, they just seem to "accumulate." But there is no harm done, nothing to undo, and the brackets can be erected so that everything clears, by the simple addition of a distance-piece, as shown in the accompanying illustration. Not only that, there will be no extra holes to drill in the rear stay, as the existing bolts holding the pony king-pin bracket to the stay, can be utilised.

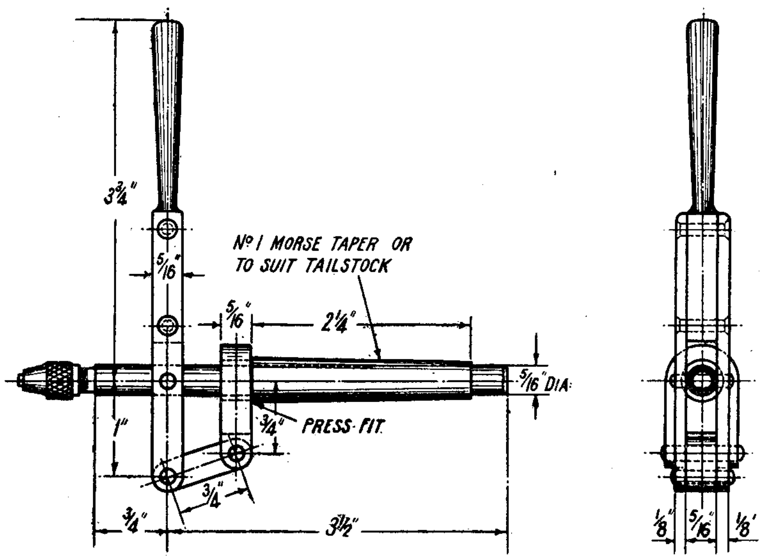
All that is necessary, is to take a strip of 3/32-in. steel, $\frac{7}{8}$ in. wide, and bend it into a rectangle measuring $1\frac{5}{8}$ in. $\times$ $\frac{5}{8}$ in. on the outside. Make the joint in the middle of one side, but don't bring the edges close together; leave a gap of about $\frac{5}{16}$ in., to clear the middle bolts on the rear frame stay, as shown in the plan view. Rivet the brake cylinder supports to this, a full $\frac{13}{16}$ in. apart; same applies, whether they are attached by angles, bent ends, or castings. If

the boiler has not been fixed, it will be easy enough to take out the end pony bracket bolts, temporarily clamp the brake bracket assembly in place, drill through the lot, using the holes in pony bracket as guide, and replace with longer bolts, as shown. This should make a rigid job.

If the boiler has already been erected, the job could be got at by taking off the ashpan ; but even that can be avoided by using a further alternative. Instead of using the rectangular support, bend the strip into a channel shape, $2\frac{3}{8}$ in. wide, as shown by the dotted lines. This will fit between the flanges of the frame stay ; and if bolts have been used to connect frame and cradle, they can be utilised to hold the extra cross-member as well. If the frame and cradle have been brazed or riveted together, separate bolts would be needed, put through the lot, as indicated in the sectioned part. Whichever type of support is adopted, take out the brake cylinder trunnion pins, slot the ends to take a screwdriver, and when replacing the brake cylinder, hold it in position whilst the trunnions are screwed into the lugs through the holes in the brackets. A weeny bit can be filed off the front edges of the brackets, to give a little more clearance between it and the axle. Next stage, tender brakes.

Injector Makers Ahoy !

If you've ever broken any small drills whilst making injector cones, through trying to feed them in with a screw tailstock, you'll be ready to join me in passing a vote of thanks to Mr. Jack Cox, designer and builder of the highly successful 5-in. gauge *Tailwagger* tank engine, for sending the drawing of a simple lever feed which can be adapted to any screwed tailstock. The drawing, reproduced here, is practically self-explanatory. A piece of mild-steel is turned to fit the tailstock barrel, and either drilled and reamed $\frac{5}{16}$ in. at the same setting, or parted off and put in the mandrel for the drilling and reaming. The fulcrum block, which carries the link for the lever, is made from $\frac{3}{4}$ in. × $\frac{5}{16}$ in. mild-steel, drilled $\frac{7}{16}$ in. at the top, and slotted to $\frac{5}{16}$ in. width at the bottom, same as a valve-gear fork. The link itself is made from $\frac{5}{16}$ in. square rod. The end of the tapered body is turned to a press fit in the hole in the fulcrum block. The lever is built up as shown, pivoted at the bottom to the link, and pinned to a piece of $\frac{5}{16}$ in. silver-steel which slides in the tapered body ; the end of the sliding rod is drilled to take the shank of an ordinary pin-chuck. Put the tapered body in the tailstock barrel, and the super-fragile drill in the pin-chuck. Operate the lever like a pump handle, but decidedly not at the same speed ! Just feed the drill in gently, running the lathe as fast as possible, and don't go more than $\frac{1}{16}$ in. at a time. Withdraw the drill, and clear the chips out of the flutes ; the easiest way to do this is to let the lever just tap against the fulcrum block each time you withdraw the drill ; the slight jar does the trick. By this method, any tyro can safely drill a No. 80 hole to the full depth of the flutes, without the least risk of breaking the drill. I've mentioned before, but it will bear repeating, that 99 per cent. of small drill breakage is caused by seizure, due to chips choking the flutes ; and if you keep withdrawing the drill and clearing away the chips, the drills will last indefinitely.



Tailstock attachment for drilling injector cones

An Auxiliary File Handle

by W. M. Halliday

WHEN using a large flat file for the removal of a substantial amount of material, the operation is apt to be tedious and hazardous if only one handle is employed on the file. If, however, an auxiliary file handle is affixed to the tip of the file at the end opposite to the tang, very much assistance will be obtained both in controlling the movements of the file, positioning it on the surface of the work-piece, and in enabling a more equalised pressure to be applied when taking a cut.

The accompanying illustrations show a very effective type of auxiliary handle which may be affixed to the sides of the file, at any desired point along its length, being gripped tightly thereto. Thus fixed, the file may be actuated in any direction without interference.

The design, construction and use of the handle is extremely simple and effective. It comprises two jaw members *A* and *B*, substantially of the same shape and size, each one being formed right-angle in shape as shown.

Member *A* is slotted at the right-hand side, and the left-hand side of member *B* is stepped equally at each side for a tongue about $\frac{1}{4}$ in. narrower than the slot in jaw *A*.

Both jaws are cross-drilled for the fulcrum stud *C* about which both members should be free to swivel.

A slotted shackle *D* is interposed between the sides of the slot in jaw *A* and straddles the stepped tongue portion of jaw *B*. This shackle is also cross-drilled to allow the fulcrum stud *C* to pass therein.

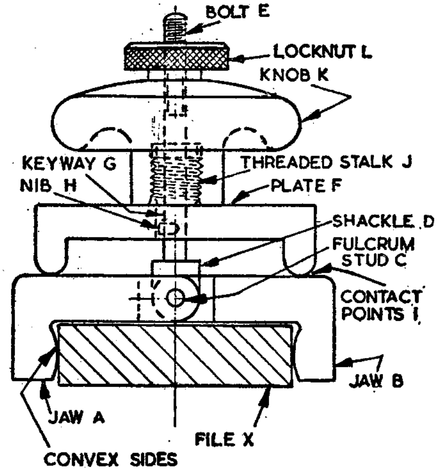
The three members thus anchored together should be free to swivel relative to each other.

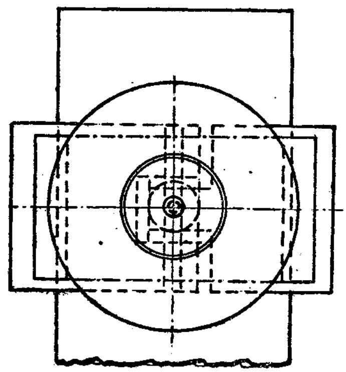
The shackle is affixed permanently to the bolt *E*, the shank of which passes through a clearance hole provided through the plate *F*. A keyway *G* is situated at one side of this hole, and a small nib *H* affixed to the shank of the bolt prevents the latter rotating therein, yet permits it to slide easily.

The underside of the plate *F* is hollowed out to form the two rounded contact points *I*, which bear down one on each jaw.

On the opposite (upper) side of the plate *F*, and concentric with the bolt hole, is a threaded stalk *J* formed integrally with the plate, or mounted as a separate piece brazed to the plate. Screwed tightly on to this stalk is the steel or brass knob *K*, which has a clearance hole to allow the bolt *E* to pass through in the manner shown. The small knurled lock-nut *L* is screwed on to the threaded end of the bolt, and bears upon a small flat on the top of the knob.

Affixing the auxiliary handle to a file *X* is easily accomplished. The jaws *A* and *B* are





simply placed one each side of the file, and the lock-nut *L* adjusted so as to draw up the bolt *E*. This in turn will cause the jaws to lift at the anchoring point, but the stepped sides of the jaws will be caused to grip tightly on to the sides of the file by reason of the contact points *I*, which will prevent any lift of the stepped ends of the jaws.

It will be noted that the stepped portions of the jaws making contact with the side of the file, are slightly convex in shape to allow for the slight radial movement arising when bolt *E* is drawn upwards.

To release the handle, it is only necessary to slacken the lock-nut *L*, whereupon the jaws *A* and *B* may expand slightly.

This type of handle may be fastened very securely to a number of files each of a different width, because of the adjustment possible with the bolt *E* and the jaws.

With an extra handle of this kind attached to the tip of the file ; the fingers, and hand will always be raised well clear of the file, and the surface being treated.

A considerable amount of pressure and support can thus be applied to the file with complete safety, and good clean strokes can be taken with reduced effort and improved control over the movements of the file.

SCREWING TO A SHOULDER

by A. D. Stubbs

OF course, it may be that I am a bad mechanic, but I just don't like screwing, or turning for that matter, to a shoulder. The first cut of a thread is all right, but the next time that I come along I pull out just a little early, " in case."

For a repetition run, my spring-loaded gadget is well worth its keep, and has the advantage that the lathe can be run much faster, because it gives a full $\frac{3}{8}$ in. safety margin after the tool first reaches the shoulder. The final cut is an annular groove, as the cutting tool no longer advances.

The general set-up is shown in Fig. 1, and in the position shown, the tool could be cutting, at the termination of the thread, and almost on the point of digging in to the shoulder. The top-slide, tool-clamp and the body of my gadget (I have not thought of a name for it yet) continue to advance, but the restricting cable, secured to the tailstock, is already tight, so holds the tool and its containing tube stationary.

Fig. 2 shows a spring between the plug and the tube. This, normally compressing the tube to the position shown in Fig. 1 has, in Fig. 2, under tension of the cable, been compressed, and the tube and tool have been held stationary whilst the lathe saddle has advanced for $\frac{3}{8}$ in. feed. It has still an $\frac{1}{8}$ in. to travel before any damage can occur.

My gadget grew around an Alfred Herbert Nulok boring tool, temporarily deprived of its square clamping holder, and to hold it without chatter, but yet permit it to slide in the body meant a little accurate machining.

Fig. 3 illustrates the tube, body and plug. For the tube, I used $\frac{5}{8}$-in. mild-steel, first drilling a $\frac{1}{4}$-in. pilot hole. As the central hole had to be a push fit, and dead true, I bored it out, using an old rat-tail file, with the business end forged to 90° and ground for internal turning.

To cut the slot, I used a key-seating cutter, after turning the outside diameter to $\frac{9}{16}$ in. In the end view of Fig. 3, tube, you will see the centre-line of the $\frac{1}{8}$-in. hole for the thread-cutting tool-bit, set at an angle to the slot. This avoids the necessity of grinding into the top edge of the cutting tool, and also has the advantage of giving a final accurate adjustment of tool height to lathe centre (see Fig. 1, end view, shown erroneously in American projection in Fig. 3).

For the body, I used $1\frac{1}{8}$-in. × $\frac{7}{8}$-in. flat steel, and here again I put a $\frac{1}{2}$-in. drill through first and then bored out until the tube was on the tight side of a sliding fit. Incidentally, the Nulok tool itself did the boring. The right-hand end of the body is screwed $\frac{3}{8}$-in. B.S.P.T. for $\frac{1}{4}$ in. depth.

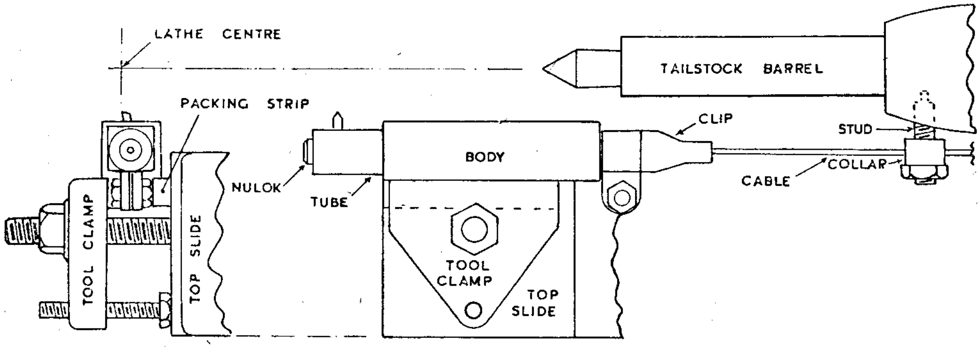


FIG. 1.

For appearance sake, I turned the outside diameter for $\frac{5}{8}$ in. length, but have not dimensioned this, as it would be advisable to retain the full width of your tool-clamp on the thickness-reduced clamping part of the body. All the external flat surfaces are milled. For the clamping portion this is essential, and a tool-room finish to the rest is worth while.

My $2\frac{3}{4}$-in. slitting saw cut the $\frac{1}{8}$-in. slot in three cuts, hence the arc shown in Fig. 3. This could be filed square, or the key could be shaped to match, but the fitting of the key, Fig. 4, must be accurate as far as its thickness is concerned. A drive fit would open up the bore of the body and give a loose fit for the tube. Conversely, if the key is slack, the body will be compressed by your tool-clamp, and bind the tube, so special care is necessary to ensure that the key thickness is just right, although the tube itself must not bind on the protruding tooth on the key. I used $\frac{1}{8}$-in. aluminium rivets to position the key, the body holes being chamfered out on both sides. Leaving the rivets proud, I merely squeezed them in the vice.

The plug, Fig. 3, is steel, drilled to pass the Nulok holder freely.

After a lot of " scrabbling " (pure Sussex)

in a box of odds and ends, I found what I believe to be an air-pistol spring. A cut-off portion of this slides over the Nulok perfectly, and in fact, the body bore was determined by the spring diameter. Incidentally, the spring must be strong, because if you adopt my practice of cutting only with the leading side and point of the threading tool, the thrust might compress the spring, with disastrous results to the thread.

At this stage the components went together. By releasing the tool-bit, the Nulok can always be withdrawn for other work, leaving my gadget complete with no loose parts except the cable, which is too long to get lost readily.

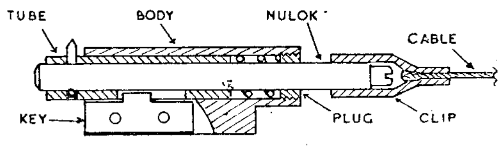


FIG. 2. NULOK NOT SECTIONED.

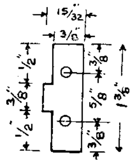


FIG. 4. KEY.

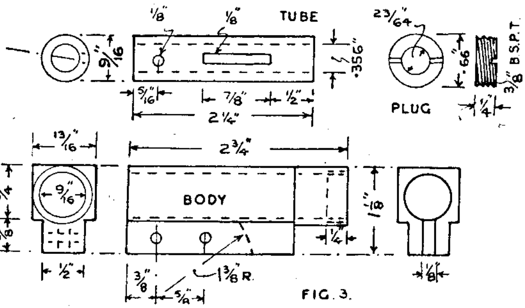


FIG. 3.

The cable length is determined by your lathe, and it must be long enough, to fill all eventualities, to reach from the body when the tool-bit is up to the lathe faceplate, to the tailstock holding position when the tailstock is at the other end of the lathe bed.

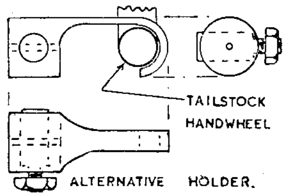
Fig. 5 shows the clip, also in steel, the slot being $\frac{1}{16}$ in. wide. In Fig. 2 I show a section at 90° to Fig. 5, with the wire in position. This is cycle brake wire, the end being sweated into the clip, where you will see that I ran an $\frac{1}{8}$-in drill in to ensure both that the cable was there for evermore and that it should clear the Nulok tightening-screw. The 23/64-in. drilled hole is $\frac{7}{8}$ in. deep. A $\frac{3}{16}$-in. steel set-screw and nut operate the clamp.

My Myford lathe has a convenient grub-screw, as in Fig. 1, so I made a combination stud to replace it, Fig. 6, which fulfils the grub-screw's job and, when fitted with the collar, Fig. 7, and a nut, enables me to grip the cable at any position of the tailstock.

For lathes without such a handy screw, I suggest an alternative holder, as in Fig. 8. This is intended to hook round the rim of the tailstock handwheel, the same tightening device being incorporated to hold the cable.

To use the device (that's better than gadget), set it up in the tool-clamp, with clip fixed and cable loose at the tailstock, as shown in Fig. 1. With the leadscrew in action, advance the lathe until the cutting tool nearly makes a nasty mess of the shoulder to which you are going to screw. At this position wind back the topslide to ensure clearing the shoulder, and clamp the cable at the tailstock. For final accurate adjustment, alter the topslide feed as necessary, slacking off the clip-locking nut, and re-lock the clip inwards or outwards as required.

Take a few turns by hand to ensure that the tool is sufficiently near the shoulder before the cable comes into action. The only adjustments possible are by altering either the cable and clips or by sliding the tailstock, so if you are working to fine limits this is a slight drawback. One day I shall make a screw adjuster on the end of the cable clip, but even as it is, my gadget, I beg its pardon, I should have said device, is earning its keep, which is meant to infer that the tube must be kept oiled.



ALTERNATIVE HOLDER.

FIG. 8.

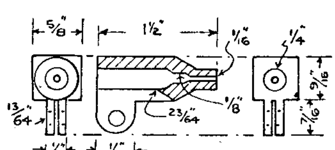


FIG. 5. CLIP.

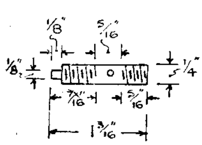


FIG 6. STUD.

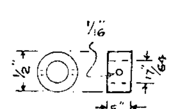


FIG. 7. COLLAR.

Calculations for Bending Sheet Metal

by S. F. Herridge

AMONG the many problems which face the young engineer in the tool room is the development of component parts, especially those of sheet metal. A typical example where the distance between the holes must be established is given in Fig. 1. This shows a component required, and in order to resolve it into lineal length, certain calculations are necessary. This shape is achieved on a form-tool which is designed for quick production and accurate location. To obtain this size, a development is made to give the approximate dimension of the bracket clip in order to proceed with a tool for piercing the holes and cropping the component to length.

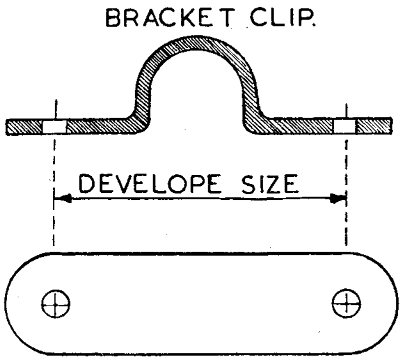


FIG I.

The factors which govern ferrous and non-ferrous metals, together with the conditions under which they are formed vary ; for example, some aluminium is soft while other groups are very hard, thus the stretch taking place through forming does not remain constant, calling for a general chart rather than an individual one. However, the one given below will provide a ready reference for basic calculations, and for convenience, it is assumed this is the angle through which the sheet has to pass forming an angle of 90 deg.

Fig. 2 denotes the method adopted, and from the sizes given it is resolved into the section shown. As the component is symmetrical about the centre-line, only one-half of the job is shown in detail.

To adapt the chart, angle "X" is the dimension given, therefore the example given will resolve thus :

$\frac{3}{8}$ in. dimension will be less one gauge of metal, less bend radius

$= 0.375 - 0.048 - 0.125$ in.

$= 0.202$ in.

1.5 dimension will be less two gauges of metal, less two bend radius

$= 1.5 - 0.096 - 0.25$

$= 1.154$ in.

again the $2\frac{1}{4}$ in. size can be divided into two parts as previously mentioned, therefore take half the

Flat Distance for X when at 90 deg.

Material thickness	1/32 R.	$\frac{1}{16}$ R.	3/32 R.	$\frac{1}{8}$ R.	5/32 R.	$\frac{3}{16}$ R.	7/32 R.	$\frac{1}{4}$ R.	s.w.g.
0.016	0.058	0.108	0.157	0.206	0.254	0.305	0.353	0.402	27
0.018	.060	0.110	0.160	0.209	0.257	0.307	0.356	0.404	26
0.022	0.063	0.113	0.162	0.210	0.259	0.309	0.358	0.407	24
0.028	0.067	0.115	0.165	0.212	0.262	0.310	0.361	0.410	22
0.036	0.072	0.121	0.170	0.219	0.268	0.322	0.366	0.415	20
0.048	0.080	0.129	0.178	0.227	0.275	0.325	0.374	0.423	18
0.064	0.090	0.139	0.189	0.238	0.286	0.336	0.385	0.434	16
0.080	0.099	0.149	0.198	0.247	0.295	0.346	0.394	0.443	14
0.104	0.116	0.166	0.215	0.264	0.311	0.362	0.410	0.459	12
0.128	0.130	0.180	0.229	0.278	0.325	0.375	0.424	0.473	10
0.160	0.150	0.199	0.248	0.297	0.346	0.396	0.445	0.492	8
0.192	0.172	0.221	0.270	0.320	0.366	0.418	0.464	0.514	6

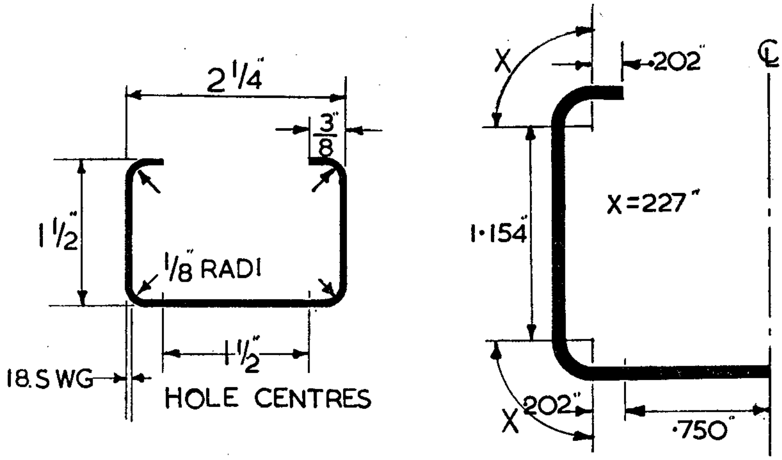


FIG 2. SYMMETRICAL ABOUT CENTRE-LINE.

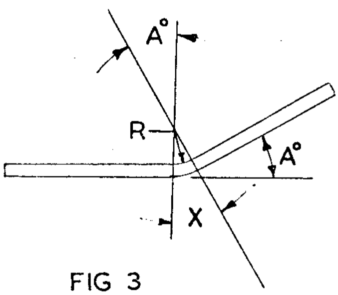
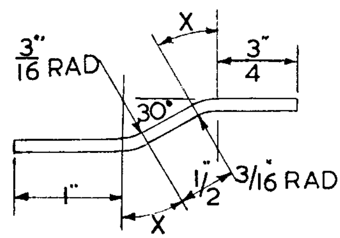


FIG 3

FIG 4



MATERIAL ·036. 20 SWG

component width, minus half the hole centre dimension as follows :—

1.125 — 0.750
= 0.375 in.

thus 0.375 less one gauge of metal, less bend radius

= 0.375 — 0.048 — 0.125
= 0.202 in.

Total length resolves into the following :—

0.202 + "X" + 1.154 + "X" + 0.202 + 0.750
= 0.202 + 0.227 + 1.154 + 0.227 + 0.202 + 0.750

Half component = 2.762 in.
therefore the complete component will be 2.762 × 2 = 5.524.
So the component in question when in flat sheet form will measure 5.524 in.

While this holds good for all items bent at 90 deg., other angles will require different calculations as depicted in Fig. 3. This illustration shows that distance X is determined by the formula.

$$X = \text{allowance for 90 deg.} \times \frac{A}{90}$$

An example of this is shown in the joggle set at 30 deg. in Fig. 4 and resolving this into lineal length we have :

$$X = \text{allowance for 90 deg.} \times \frac{A}{90}$$

$$= 0.322 \times \frac{30}{90}\text{ deg.}$$

$$= \frac{0.322}{3}$$

therefore X = 0.107 in.

thus the distance in the flat will be
1.0 + 0.107 + 0.50 + 0.107 + 0.75 in.
= 2.464 in. overall length.

From these basic examples, numerous problems can be solved and practical results obtained.

Loco Wheels and Axles

Some Elementary Notes for Beginners

by R. N. Lochhead

FOR a beginner, "L.B.S.C.'s" *Wee Dot* seemed to be the very thing the doctor ordered, so, full of anticipation, I ordered a set of castings.

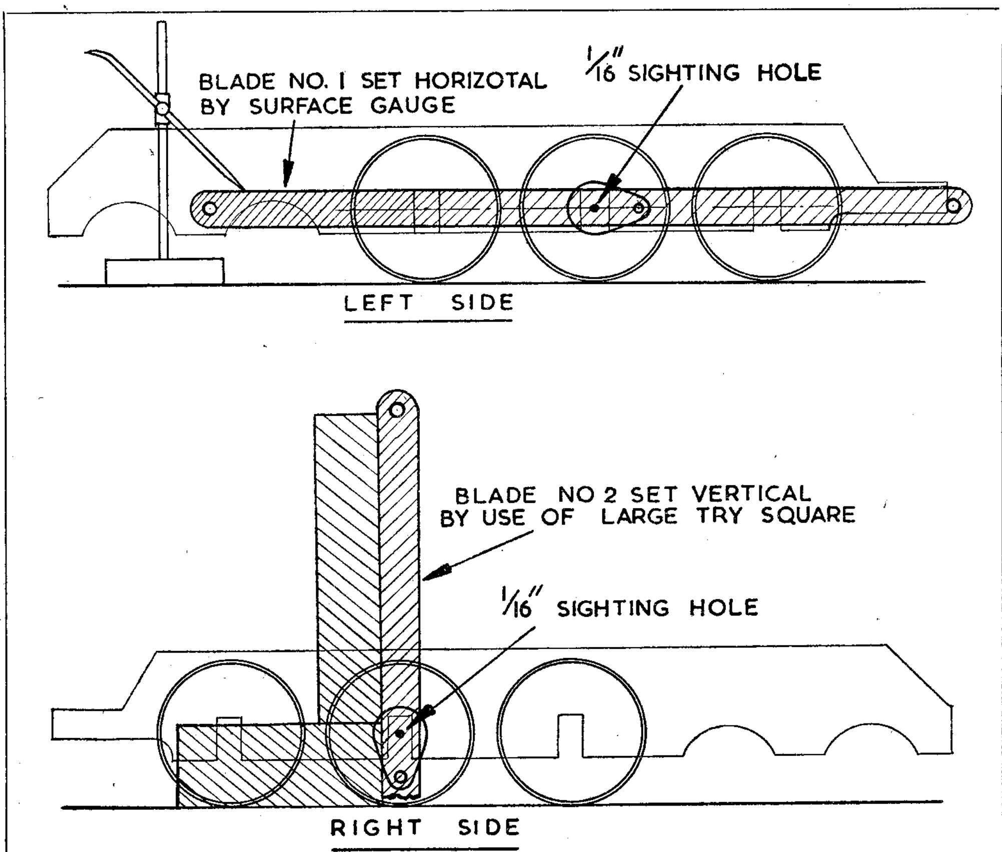
For some indefinable reason I ordered seven driving wheels ; perhaps it was a premonition of what was to come, for before very long I was to need that spare wheel.

Having followed the "words and music" to the best of my ability, I arrived at the crucial moment when an axle was fitted to its wheel and the handle of the vice was gently turned. All went well and the first wheel was safely pressed on to its axle. With the confidence born of the first success, I proceeded to the second wheel and axle, and was greeted with that sickening crack denoting the extent of my ham-fistedness or lack of skill with a micrometer.

So the seventh wheel became a vital factor to the building of my first locomotive, and I had to think a little to prevent further disasters.

As there must be many others who are stepping into the ranks of locomotive builders for the first time by way of *Wee Dot* I would like to recommend to them the results of my experiments in wheel fitting and wheel quartering, in the hope that they may be helpful.

The solution to the problem of a good press fit for the wheels seemed to be a gauge for the axles. So I got a bit of scrap steel $\frac{5}{16}$ in. thick and drilled and reamed it exactly as was done for the wheels. I tested it with a piece of 7/32 in. silver-steel and found it of precisely the same size as the wheel bores. Then I reamed it again with a piece of 16-gauge steel wire in the flutes of the reamer. The result was a hole just that little bit bigger than the wheel bores. Then I turned new axles, making the wheel



seats a finger-tight fit in the steel gauge. All six wheels were now safely pressed on to their axles and I used the same method with the bogie and tender wheels with never a sound of over-stressed cast-iron.

Quartering the Driving Wheels

Perhaps my eye is not so "straight" as the average engineer's, but when I came to quartering the wheels I found the simple instructions given for this operation to be too simple. After two hours careful adjusting and readjusting I was still dissatisfied with the result. So, another gauge seemed to be indicated.

Two old hacksaw blades were used, as the backs of the blades gave nice straight edges for reference purposes. The blades were annealed in a gas flame and a centre-line drawn along the blades with jenny calipers. Then at the middle of one blade a centre-pop was made and another at $\frac{7}{16}$ in. away to correspond to the crank throw. A $\frac{1}{16}$-in. hole was then drilled at the middle centre-pop and a $\frac{1}{8}$-in. hole at the other. The second blade was marked out in a similar manner, but the holes were drilled at one end of the blade. The first blade was then fitted to a wheel, which was already pressed on to its axle, by passing the crankpin through the $\frac{1}{8}$-in. hole and putting on washers till the blade was firmly gripped, when the retaining nut was tightened. The $\frac{1}{16}$-in. hole was then adjusted till it was exactly over the centre of the axle, as shown by the toolmark left when facing-off the axle. The crankpin nut was then firmly tightened. The second blade (the one with the holes at the end) was similarly adjusted to the corresponding wheel for that axle, using a dummy loose-fitting axle for finding the centre. The accompanying sketch shows how these blades were used, much more clearly than words can describe the process. All three pairs of wheels were fitted by this method, and I am glad to say that they proved to be in perfect alignment when the coupling-rods were attached.

PRACTICAL LETTERS

Model Cars and Model Engineering

DEAR SIR,—I do not quite see the point of the long letter from Mr. Manwaring in the March 22nd issue.

I recall the words which an old toolmaker used of the chief designer (also a director) of the firm to which I was apprenticed :—"Him? Don't you take no notice of what *he* says ; he's only a tester, he never *made* anything."

This is the spirit in which THE MODEL ENGINEER has been conducted since its foundation : the emphasis is on the workshop ; the engineer ("model" or otherwise) is primarily someone who *makes* something, the testing and running of it after it is made is quite secondary in interest, it is only required to see that the result "works," and to suggest improvements.

Your correspondent writes of "a gang of fellows who just enjoy racing model cars"—*c'est magnifique, mais ce n'est pas la guerre*—Magnificent sport, but not engineering !

To the query "Why does a model car racer have to be a model engineer ?" I suggest the reply is "He is not"—and that therefore the pages of THE MODEL ENGINEER are not the place to record his deeds.

Yours faithfully,
Cambridge. "C.R.C."

DEAR SIR,—Mr. L. A. Manwaring, in his letter on the above subject, in the March 22nd issue, asks "Why does a model car racer have to be a model engineer ?" The simple answer is that he doesn't ! Anyone who wishes to do so can race model cars and there is no more compulsion for them to become model engineers than for them to join the Boys' Brigade or the Communist Party. But the strange thing is that most of the racing exponents consider that they have a claim to be regarded as model engineers, and still more illogically, to be entitled to a good deal of space in journals devoted to model engineering.

I have always been a strong opponent of the "closed shop" in model engineering or anything else, and I am in favour of accepting anyone with a real interest in any of the many branches of the hobby, as a member of the fraternity, whether he is an active constructor of models or otherwise. But it should be remembered that model engineering depends, not only for its general popularity but its very existence, upon craftsmanship ; and I have a firm conviction that "model sport" in itself can never be an adequate substitute, or even run successfully in double harness with the creative side of model engineering.

The "model sportsman" who has no other interest than the attainment of speed, without regard to the very essential preliminaries of design and construction, must necessarily have an entirely different outlook to the model engineer who delights in delving into mechanical problems and working them out in concrete form. I am not arguing who is right or wrong about this—but I have my own ideas as to which is the more worthy object of the two.

One of the reasons why model engineers are liable to view model sport with some misgivings is that it often appears to the beginner as a short cut to spectacular results. The newcomer to competitive model sport, who may start off with a genuine mechanical interest, is quite naturally keen on getting results as quickly as possible, and is most likely to take the line of least resistance, by buying an engine, and possibly other mechanical components, rather than taking the trouble to construct them. Especially so, when he sees that nearly all the plums go to the ready-made engines. Apart from anything else, time is against the constructor, as the production of engines in a home workshop is a very different

thing to manufacturing them in quantity. I hear of many beginners who express the intention of using commercial engines to gain experience, and then start building engines themselves, but very few indeed ever follow up this resolution.

By all means let us have model sport, and let the users of commercial engines enjoy themselves with high revs and record speeds, but please do not try to tell us that they are better men than those who build engines, even if the latter do not put up such a spectacular performance. I know of several really fine craftsmen who have literally been frozen out of competitive events by lack of encouragement of their particular talents. I speak as one who is just as interested in speed, or high engine performance, as the next man, but I consider that attainment in this sphere should be the reward of brains, effort and enterprise, and not merely cash or "contacts."

Yours faithfully,
EDGAR T. WESTBURY.

DEAR SIR,—Bravo! L. A. Manwaring, Edmonton M.C.C.—**LIVE AND LET LIVE!!** There's room for all.

Yours faithfully,
C. A. RIPPON.

Whetstone. *Founder Member North London Society Model Engineers.*
Founder Member and Fellow Society of Model Aeronautical Eng.

What Price Efficiency?

DEAR SIR,—Permit me to endorse all that "1121" says in "What Price Efficiency?" in the March 22nd issue of THE MODEL ENGINEER. For some years it has puzzled me why some clubs holding efficiency trials have seemingly gone out of their way to evolve the most elaborate and meaningless formulae involving wheel diameters, cylinder sizes, etc. Efficiency is simply the amount of work performed in relation to the amount of fuel used, e.g., if one locomotive will move a load of x lb. a distance of say, 4,000 yards, by using y quantity of fuel and another locomotive moves a load of x lb a distance of 5,000 yards by using y amount of fuel, obviously the second locomotive is the more efficient. Wheel and cylinder sizes obviously do not come into it.

We know that full-size locomotives are compared by theoretical tractive effort, but we also know that in practice these figures are meaningless; witness the "Royal Scots" in their original form and in their rebuilt form. Their characteristics are identical as must be their theoretical tractive effort, but not so their performance on the road. What does interest C.M.E.'s is actual road performance figures such as pounds of coal used per ton mile, etc.

No, tractive effort does not come into it. What is important is that in any test all conditions are equal; by that I mean that in an efficiency trial the same trucks should be used throughout in the same formation each time, increasing or decreasing as the driver may request, but those that are used always in the same order. This will tend to reduce one variable, viz. friction. Loads must be dead and not composed of live passengers. The load I suggest should be bags of sand or concrete blocks, etc., but always of a precise known weight. The biggest difficulty is in assessing the quantity of fire in the firebox before and after the run.

All that is required for a formula is $\dfrac{TL \times D}{F}$ where TL = total load hauled (including driver and locomotive), D = distance in yards and F = amount of fuel used in ounces. We should then get something like this :—

$\dfrac{800 \times 4{,}000}{16} = 20{,}000$. The larger the resultant figure the greater the efficiency.

As "1121" says, tests of this kind would tend to develop good drivers instead of drivers who forget the purpose of a reversing lever and keep piling the coal in.

In conclusion I should like to say how much I have enjoyed all his articles, not forgetting the sketches, but unfortunately how true they are.

Yours faithfully.
Birmingham. W. FINCH.

The 4-in. Round Bed Drummond Lathe

DEAR SIR,—Last year I saw one of these lathes in the showroom of a big engineering concern here. It was on maker's stand, treadle driven, with one small chuck, and for this they wanted £85! On inquiry I was told that it was being sold for a private owner, and it was his price. From its appearance it was between 30 and 40 years old, as it had the cross-slide with 4 slots and V-guides and tool holder with sloping back, also separate headstock bearings, indicative of very early models.

The 4-in. bench lathe of those days sold for about £5 according to THE MODEL ENGINEER adverts. of the period, and allowing £3 10s. for stand and treadle, we have the interesting case of a machine at least 30 years old being offered for nearly ten times its original price. One wonders if this is a tribute to the makers of the lathe, or the audacity of the owner!

Yours sincerely,
Cape Town. A. E. F. SPENCE.

Miniature Camera Construction

DEAR SIR,—I recently arrived home from a job to find a large number of letters from friends who have written to me directly, and two letters received from your office. Most of the letters contain advice about making cameras, all of which is most useful. Unfortunately, no two letters agree as to the best type of camera to make and the size to make it. I am forced to the conclusion that the ideal camera for a model engineer is about as difficult to find as his ideal lathe. The advice I have received is to make a camera from a miniature up to a ½-plate size.

I have been offered cameras at various prices, but I do not wish to buy one. I want to make one myself, Mr. Morrison's offer to lend me a camera to copy is much appreciated, I have had the offer of two more to copy from friends much closer to Colwyn than is Mr. Morrison.

Two courses are open to me. One is to copy an actual camera size for size. The other course is to go ahead and design my own. The latter

method is the one I will adopt unless an interesting design crops up in the pages of THE MODEL ENGINEER.

I have wanted to make one for a long time; unfortunately, I have a few jobs to finish off first before I can start on it. I am looking forward to reading more articles on camera making in THE MODEL ENGINEER. I hope to be in a position to send you one of my own soon.

My thanks to the writers of all letters received. The advice and criticisms are much appreciated.

Yours sincerely,

Colwyn Bay ANDREW TODD.

CLUB ANNOUNCEMENTS

The Society of Model and Experimental Engineers

The next meeting of the society will be held at Wanless Road headquarters at 3 p.m. on Saturday, May 5th, 1951. The meeting, which will be an informal one, will be a workshop demonstration of "Generating Cams for I.C. Engines in a Milling Machine," by Col. D. H. Chaddock. Apart from its very real interest to i.c. engine enthusiasts, the demonstration will also afford members an opportunity to judge the capabilities of the new Senior milling machine which has recently been installed.

Visitors and members of affiliated societies will be welcomed, and forms of application to join the society may be obtained from the Hon. Secretary, A. B. STORRAR, 67, Station Road, West Wickham, Kent.

Cape Town Society of Model and Experimental Engineers

The annual general meeting of the above society took place recently before a good attendance of members.

The past year has been a very satisfactory one for our society and our membership is increasing steadily.

We have a very busy time ahead of us, as we are cooperating with the South African Railways in putting on a big model exhibition at the Van Riebeck Tercentenary Celebrations in Cape Town in April next year and have many models to complete before that time.

We hope in the near future to obtain permanent headquarters for ourselves, as at present the lack of same is one of our biggest drawbacks.

The society once again extends a warm welcome to any model enthusiast from overseas who should be coming to or only passing through Cape Town should he care to get in touch with us at the box number address below.

Our meetings at present are held on the second Sunday in each month.

Hon. Secretary: H. M. WALKER, P.O. Box 2430, Cape Town.

North London Society of Model Engineers

Will secretaries of clubs affiliated to the S.M.E.E. note that the above society will hold an "Affiliation Day" at the Barnet Water Company's Sports Ground, Arkley, Herts, on May 20th. A full programme covering all model interests is being arranged. Locomotives, aeroplanes, and model cars will be in action, and live steam will be laid on for demonstration of home and visitors' exhibits Yachts and boats, miniature railways and science and research sections will be well represented. A "junk stall" will be featured and visitors are invited to bring any items of which they wish to dispose. It is hoped to make this one of the big events of the year, and should be worth a visit by members of even distant clubs.

Admission is by ticket which carries on reverse side a plan of the site with bus routes. The ground is easily reached from Barnet.

Application for tickets should be made to Affiliation Delegate, A. F. WEAVER, 26, Selborne Gardens, Hendon, N.W.4.

The Bristol Society of Model and Experimental Engineers (Incorporating The Bristol Model Power Boat Club)

At a recent well-attended meeting of the above society, members were privileged and delighted to hear a talk by Mr. J. N. Maskelyne on "Modelling Locomotives to Scale." All were agreed that it was a most interesting and instructve subject and that the speaker was a pleasure to listen to and put over his thoughts in a most forthright and entertaining way.

Hon. Secretary: F. C. WATTS, 7, Fifth Avenue, Northville, Filton, Bristol, 7.

Stephenson Locomotive Society

At the 42nd annual general meeting held recently, at the society's headquarters, Russell Road, Kensington, W.14, one of the main features reported was the record enrolment in twelve months of nearly 200 new members. Mr. A. J. Boston, chairman, presided, being supported by Mr. W. H. Whitworth, of Manchester, vice-president the executive officers and representatives from the Scottish and English provincial centres. There was a large attendance; latest photographic exhibits and other relics added to the decoration of the club room were admired, with appreciation to the railway officers and members who had presented them. Several more special train tours over lines not usually used by passenger trains have been planned in the Edinburgh, Huddersfield, South Staffs, or other areas, together with an extensive series of visits to locomotive works and sheds, some being arranged as weekend tours for members. Mr. D. S. M. Barrie, M.B.E., Publicity and Public Relations Officer, British Railways, gave an interesting talk at headquarters entitled "Progress and Problems of British Railways," including glimpses of the past, afterwards replying to various questions regarding present-day facilities and policy.

General Secretary: H. C. CASSERLEY, Ravensbourne, Berkhamsted, Herts.

Harrow and Wembley Society of Model Engineers

This society held a meeting recently at the Sea Cadets' Headquarters, Kenton. Members were given a talk on foundry work, illustrated with slides, by Mr. W. Wilson and Mr. A. Talbot, of Messrs. Le Grande Sutcliff & Gell. The subject discussed was the manufacturing of a 6 ft. diameter, 34½ in. wide, 15 in. boss diameter, 20 V-belt slush pump pulley cast in silicon aluminium, with a finished weight of 3,600 lb. The whole set-up from a few chalk marks on the floor, core box design, heat control methods and the usual technical intricacies surrounding such an undertaking, was followed with great interest by all present.

An invitation is given to all model engineers in the district to join us.

Hon. Secretary: C. E. SALMON, 11, Brook Drive, Harrow

Glasgow Society of Model Engineers

The following competitions and regattas have been fixed for season 1951. Sailing water, Maxwell Park, Glasgow. Competitions and regattas commence at 2.30 p.m. on the following dates:—

Saturday, May 5th. Opening rally of all power boats.

Saturday, May 12th. Scottish steering championship for the "Hannah Challenge Trophy"; 100 yards course (open to all comers).

Saturday, June 2nd. Scottish speed championship for hydroplanes (open to all comers).

Saturday, June 16th. Steering competition for prototype boats. Championship course confined to Glasgow.

Saturday, June 30th. Scottish National Cup for hydroplanes confined to Scottish craft.

Saturday, July 7th. Cameron Cup. Glasgow challenges Edinburgh.

Saturday, July 28th. Nomination race. Coats Trophy.

Saturday, August 11th. Lewis Invitation Cup. Hydroplanes only.

Saturday, August 25th. Merit Cup. Prototypes best performance of the season.

Saturday, September 8th. Closing rally.

Joint conveners of power boat section: Peter Ribbeck, hydroplanes; Sydney Cockburn, prototypes.

Committee: Robert G. Leckie, Walter J. Greer, Andrew Blackwood, Robert Sutherland and David C. Jeffrey.

Particulars of the events can be had from any member of the committee, or from the Hon. Secretary, ALLAN RODGER, 93, Ormonde Avenue, Muirend, Glasgow, S.4.

Lincoln Model Engineering Society

In spite of the fact that this society has been without a secretary for the past twelve months, it was shown at the annual general meeting that there is pronounced enthusiasm.

The club's new 5-in. gauge locomotive is rapidly nearing completion, mainly due to the driving force of our new chairman and president. This should be on the track in the near future.

Hon. Secretary: GEO. T. SINDALL, 53, Geneva Avenue Lincoln.